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# The Agrarian

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



PENDLETON FARMERS  
SOCIETY HALL

DECEMBER

1938

TO

CLEMSON  
S. C.

MARCH 1943



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### *Acknowledgment*

*We wish to acknowledge the unselfishness of the agricultural engineering students for discontinuing their Agricultural Engineer and joining with the other agricultural departments to make this magazine possible. In order not to have several departmental publications, the agricultural engineers heartily endorsed the idea of one general agricultural magazine. With this acknowledgment, we are very happy to present The Agrarian, official student publication of Clemson Agricultural College.*

THE EDITORS



# The Agrarian

OFFICIAL STUDENT PUBLICATION

VOL. I



No. 1

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## FOREWORD

FOR many years Clemson's school of Agriculture and department of Agricultural Education have been without an official publication through which agricultural articles of widespread interest could be published and made available to interested readers throughout the state. The need of an agricultural magazine has been manifested by both the faculty and student body. Through this publication students of agriculture will have a channel for their writing. Faculty members will also have an opportunity to make known their recent findings and accomplishments. At the same time students with business ability may receive valuable training in actual business methods which will be of great value in future years.

It is our earnest desire to give our readers a cross-section of agriculture. In order to do this we have given each department their pro-rata share of the magazine and the departmental editor is responsible for that section. In this way no one department will dominate the magazine.

As the magazine is more or less a technical publication, we are striving to get it into the hands of our agricultural leaders. We believe through our county agents, specialists, agricultural teachers, instructors and leading farmers we will accomplish our goal. With this selected type of readers our circulation will be even larger than the actual number of copies mailed because these readers will undoubtedly take articles of special interest and further circulate them.

We wish to extend our sincere thanks to all who have been instrumental in making this publication possible. Without the valuable aid and assistance from our professors and extension workers, and the financial aid of our advertisers, this magazine would have been impossible.

In order to make our publication perpetual, we have selected a junior staff to work under our supervision; we are receiving valuable assistance from them; and they, at the same time are getting experience to carry on next year. It is our earnest desire to make this publication a permanent part of the school of Agriculture and Agricultural Education.

HARRIS L. BEACH  
Editor-in-chief.





DR. E. W. SIKES

## GUEST EDITORIAL

*By DR. E. W. SIKES*

Agriculture and Democracy are closely akin. It is yet to be demonstrated that the spirit of democracy can survive independent of agriculture. Fanciful "isms" flourish most among the non-agricultural groups.

The danger that confronts America today is the vanishing frontier. Our task is to adjust our-

## A LEADER HAS PASSED

The Agrarian Staff together with the whole State of South Carolina laments the passing of one of the South's greatest agricultural leaders, Dr. David R. Coker, who passed away recently at his home in Hartsville. Dr. Coker was a man who will ever be remembered as a great credit to the state of South Carolina and to agriculture in the South. His experiments with cotton breeding brought increased yields and returns to a great many farmers. The high character and influence for good which was ever-prevalent in Dr. Coker's life will stand as a goal toward which the young manhood of South Carolina may strive.

selves and our government to this change. The first period of our history granted "relief" by giving up the public domain. Every depression was met by granting public lands to those in need. The Civil War was followed by the Homestead Act; the unemployed could go West and secure land on which to make a fresh start. That era has passed. Harry Hopkins has no outlet like that, hence "relief projects" and "pump-priming" have become the vogue.

Jefferson advocated and wanted a democracy based on agriculture. It was a dream which could not become true. Hamilton was more realistic and saw that industry and manufacturing would come. The American task from the beginning has been to harmonize these two theories. Much that we think is new today is old in principle but new only in method.

Neither the agricultural nor the industrial problems can be settled separately. They are bound together like the Siamese twins. Industries more and more will come South, but the southern part of

(Continued on page 30)

## AGRARIAN ADVISORY COMMITTEE



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THE AGRICULTURAL BUILDING

## Our School of Agriculture

THE Clemson Agricultural College, which is the A. & M. College of South Carolina, is situated in the red foothills of the Blue Ridge Mountains in northwestern South Carolina. Founded in 1889 by Thomas G. Clemson who donated the land formerly belonging to his father-in-law, John C. Calhoun, it began as an agricultural college but today has five schools other than the "ag" school. Clemson began educating the agricultural youth of South Carolina in 1889 with a small endowment from Mr. Clemson together with some state support but today it is a state and Federal supported school as are the other land grant colleges.

Since the founding of the institution, the agricultural courses have been popular and a large number of "ag" graduates have gone out to take high positions in agricultural pursuits throughout the country. There are 300 students enrolled in the school of agriculture instructed by thirty faculty members. Clemson's enrollment this year is over 2,100.

For a long time Clemson was an agricultural school without an agricultural building but within the last two years it has occupied a new \$400,000 building which houses most of the school of agriculture, experiment station, and extension service. This building is equipped with the most modern classroom and laboratory equipment.

The school of agriculture offers B. S. degrees

in Agricultural Economics, Agronomy, Animal Husbandry, Dairying, Entomology, Horticulture, and Agricultural Engineering. The Agricultural Economics department is well known for its research in tax and sociological studies. Dr. H. P. Cooper, Dean of the School of Agriculture, is head of the Agronomy department. Through his influence agriculture in South Carolina is being revolutionized. He has been responsible for soil surveys throughout the state which proved that the majority of soils were acid and this is being corrected by liming. He has also focused the attention of the farmers on the nutrient deficiencies in the soil and the remedies for this. Dr. Cooper is a national authority on soils. Professor G. H. Collings of the Agronomy department has written two nationally known books, *Fertilizers* and *Cotton*.

The Animal Husbandry department has developed the most outstanding herd of Berkshire hogs in the country, having won more prizes for these hogs at the national swine show than any other herd. The Dairy department has one of the most modern plants in the country including the latest milk handling equipment and a herd of cows second to none in the South. The Entomology department administers the crop pest law of South Carolina and also supervises the inspection of nursery stock and the certification of plants and seed. The Horticulture

(Continued on page 30)



# AGRICULTURE AND THE ENGINEER

By H. K. HERLONG, '39

**A**GRICULTURAL Engineering is a young and growing profession which developed in response to an urgent need. It was not recognized as being apart from Agriculture until farm machinery developed so rapidly and became so complicated as to force the average farmer to call for help when his equipment needed servicing. But farm machinery is not the only service the engineer renders to the farmer. His service is divided into four fields of activity, namely; farm power and machinery, soil conservation, rural electrification, and farm buildings.

Farm power and machinery deals with the converting of mechanical energy into farm use. The engineer makes use of every mechanical advantage that will replace manual labor. The large farm machinery companies are always searching for information that will aid the farmer in doing his daily work, and are always open for suggestions to improve their products. The problem confronting the engineer is to develop an efficient machine that will yield a profit. The rapidly increasing use of machinery makes this essential for further progress.

Rural electrification involves the converting of electrical energy into agricultural uses. This field is developing even more rapidly than the mechanical field, due to the recent rural electrification program. Here the engineer is confronted with the task of constructing rural lines as well as finding a use for the power after it reaches the farm.

Soil and Water Conservation is receiving particular attention at present by the U. S. Department of Agriculture. Millions of dollars have been spent solely for experimental purposes to find a better means of protecting what little soil we have left and to try to build more through the use of cover crops, legumes and crop rotation. The farmer is dependent on the engineer to furnish him with information relative to terracing, strip cropping and other forms of soil preservation.

The study of Farm Buildings may easily be

called "The Architecture of American Agriculture" in that it deals with the planning of all farm storage and curing buildings as well as dwelling and tenant houses. It is one of the most important phases of the engineer's work in that it lays the foundation for better planned farm homesteads which make for greater convenience and more sanitary conditions throughout.

## Big Task

Generally speaking the farmer looks to the engineer for information relative to the discoveries of our scientists, the inventions of our mechanics, and all day-to-day agricultural advances. We have but a few well trained "Ag-Engineers" and it is quite evident that these are faced with a tremendous task. They may be compared with a regiment of men faced with the job of rebuilding an empire. What

we need is an engineer in every county-seat to play the role of a country agricultural doctor. County agents are doing a very commendable job, but however active and well

trained they may be, they cannot more than begin the work alone.

It has been the custom in the past for students to specialize in certain phases of farm operation. Specialists are still needed but the individual farmer cannot afford to call in one every time a small problem arises. What he needs is an Ag-Engineer whose knowledge of farming in general will help him to solve his common problems; however, more complicated situations will arise, in which case the engineer may consult a specialist for the solution.

## Scientific Data Available

What is most puzzling is the sad state of affairs the farming industry is in at present, with all of the scientific data, which has been tried and proven, available to the farmer *free*. Still he goes on in the same proverbial "rut", and is seemingly content to do so. It is not so baffling either when we stop to consider that some people have to be blasted into taking action for their own good. Maybe it is just human nature, but it is surely a terrible handicap in the battle for agricultural security.





# The Pendleton Farmers Society

By J. L. SHEALY, '39

ONE hundred and twenty three years ago a group of farmer's organized a society in the Pendleton district of South Carolina which is today the oldest farmer's society in America. The great object of this society was the agricultural improvement of the district, by directing the attention of their brother farmers to the various branches of rural economy, and the introduction of the most modern and approved system of husbandry. As an organization, the society has always been an adult school for farmers and a pioneer ever opening new and true methods in the first and greatest vocation of man.

## *Prominent in History*

The Pendleton Farmer's Society holds an important position in the history of the state and the United States. The membership of this society through its one hundred and twenty three years of existence has been large, and descendants from the members are scattered from S. C. to the Pacific coast. On its membership rolls, preserved in the old hall owned by the society are to be found the names of John C. Calhoun and Thomas G. Clemson, both of whom took an active interest and participated in the work of the society. In a paper read by Mr. Clemson in 1867 the advantages of the establishment of the college such as Clemson were strongly set forth and from this germ of thought was developed the Clemson idea that finally culminated after Mr. Clemson's death through the execution of his will, in the location and establishment of the college which bears his name. One of the oldest members of the society was not far wrong when he remarked that "the Pendleton Farmer's Society is the mother of Clemson Agricultural College."

An act of the legislature in 1826 divided Pendleton district into Anderson and Pickens Districts and also suspended work on the new court house. The Pendleton Farmer's society came into possession of its present building prior to 1829. According to some of the older citizens, the walls were built up to the window sills by Pendleton District and the balance of the wall was built by the Pendleton Farmer's society before 1829. Citizens say that in 1843 Calvin Hall built the four tall, brick columns at the ends of Farmers' Hall, extending the roof over them as it now stands, and making other changes inside the hall. This hall as it

stands today looks very much like the description given in 1843.

## *Centennial Celebration*

In 1915 the society held its centennial celebration in Pendleton on October 12-13 and at Clemson College on October 14. Clarence Poe, editor of the *Progressive Farmer*, of Raleigh, N. C., was the speaker at this occasion. He spoke on "Cooperation as the Basis of Rural Community Spirit." Col. J. C. Stribling, President of the Pendleton Farmer's Society reminded the members that the first cooperation in Agriculture was in 1815 and 1816 when the Pendleton Farmer's Society built its first hall. On October 13th addresses were made by Hon. David F. Houston on "Problems of Agriculture in the South," Gov. R. I. Manning on "The Benefits to be Derived from the Farm Demonstration Work," Pres. Fairfax Harrison of the Southern Railway on "The Crooked Plow" and Rev. W. H. Mills on "The Contributions of the Pendleton Farmer's Society to the Agriculture of South Carolina and the South." On October 14, the society closed its great celebration at Clemson College with Hon. A. F. Lever, representative and chairman of the congressional committee on agriculture, delivering the principle address of the day with advice to the men of tomorrow.

## *Today's Activities*

Although the greatest period in the life of the society was from 1815 until the Civil War, it has by no means ceased its activities today. From the first President, Thomas Pinckney, Jr., to the present one, Mr. J. B. Douthit, Jr., the society has always been under the leadership of men prominent in both State and National affairs. Mr. Douthit is the breeder of Douthit's Prolific corn, one of the leading varieties in the South, and manufacturer of Douthit's sausage.

The present day activities of the society are as follows:

The society appropriates \$50 annually for prizes to students in vocational agriculture at Pendleton school. This has been done for the past two years and is expected to be continued indefinitely.

The society makes a small contribution each year to the Red Cross and other activities of that nature.

(Continued on page 30)



# Spiders

By E. C. STURGIS, '39

**M**OST people are afraid of spiders. Nevertheless, to lovers of nature, spiders are among the most interesting of all animals. They are found all over the world and are very numerous both in species and number of individuals. About fifteen thousand species have been identified and separated into sixty different families; representatives of about thirty families and fifteen hundred species are found in the United States. Spiders are provided with poison claws which are used to kill their prey, but with the exception of the Black Widow Spider of the South and the Tarantula of the Southwest, are no more harmful to human beings than are beetles and ants.

## *Spiders Not Insects*

Spiders are not classed as insects; They can be distinguished from them very easily because spiders have eight legs whereas insects have only six. Usually spiders have eight eyes but some species have a lesser number. Spiders have a unique digestive system which acts as a reservoir. Large quantities of blood can be stored in the abdomen, being used up as needed. In this manner spiders may live for a period of a year or more without taking in food.

The eggs of spiders are laid inside of small egg-sacs which are made of silk. These sacs are attached to some object or carried about by the mother. The young are cannibalistic in nature and the most vigorous ones will eat the weaker ones before emerging from the egg-sac. This cannibalistic nature is prevalent in spiders in general; often the adult female will devour her weaker mate.

## *Sting Victims to Death*

Spiders differ in their ways of capturing insects. The most common method is to rest quietly at the side of the web until an insect is caught in the web. Then they rush out and wrap threads of silk around the body of the insect, and sting their victim to death. After all struggling has ceased, its juices are sucked out by the spider.

Probably the most interesting habit of most spiders is web-building. The webs are woven of a fluid secreted by glands located in the abdomen and forced out by means of organs called spinnerets. This fluid hardens when exposed to air.

## *The Black Widow*

The Black Widow Spider is a shiny, jet black spider having a body about one half inch long. A characteristic mark by which it may be identified

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# Production Control and Tariff

By R. L. ARIAIL, '40

THE Southern Economics Association, the foremost of its kind in the South, held its annual meeting in Birmingham on the twenty-eighth and twenty-ninth of the past October. Practically all of the leading institutions in the South were represented, including Clemson College, Furman University, The Citadel, and the University of South Carolina of this state. Many distinguished men were present. Among them were Drs. G. H. Aull, J. E. Gates, W. T. Ferrier, and J. E. Ward, who represented Clemson.

Among the many interesting events of the meeting were the addresses by Drs. W. E. Ayers, the retiring president of the association, and L. H. Bean, economic advisor to Secretary of Agriculture, Henry A. Wallace. An interesting sidelight of the meeting was furnished by two visiting economists from Sweden. At an informal gathering these gentlemen discussed the contrasts in American and Swedish economic and educational systems.

It seemed extremely difficult for these visitors from abroad to visualize the relatively large number of economists in America, for Sweden has only six. Neither could they understand how these American economists could carry on under the added strain of teaching classes. In contrasting the American and Swedish Systems of higher education, they pointed out that in Sweden the primary group concerned is the faculty, but over here it is the students that are concerned. Incidentally only a small percentage of the Swedish youth have access to colleges.

## *Discuss Pertinent Topics*

The principal topics of discussion were the production control program, the Social Security Act, monetary policies, factors influencing the location of industries, and the possibilities of the expansion of foreign trade of southern commodities.

Dr. G. H. Aull, head of the Department of Agricultural Economics and Rural Sociology at Clemson, discussed the problem of production control, from the standpoint of its advantages and disadvantages. He defended this program as a means of enabling the farmers to adjust production to current demands, and of putting agriculture in a better position to cope with the national and international situation.

## *Tariffs Reduce Our Trade*

There are some who think that the foremost

factor contributing to our loss of foreign markets is the curtailing of production. But, as investigation will reveal, the principal cause is not due, nearly so much, to the over production of agricultural products as it is to the high industrial tariff that we have imposed on our foreign neighbors. For example, we formerly sold enormous quantities of raw cotton to Germany, but instead of cooperating with her as one of our largest customers, we imposed an extremely high tariff on her finished products that were imported to America. Furthermore, if we consult statistics, the records will show that foreign competition of cotton production increased long before President Roosevelt's inauguration, under whose administration the production control program was introduced.

According to Dr. Aull most economists agree that the Hawley-Smoot Tariff Act has done more to aggravate the farm problem than any other single contributing factor. It became effective at the particular time that we should have been helping a depressed world to recover, but, as afore mentioned, we imposed, instead, an exceedingly heavy duty on nearly all imported goods. As a result of these duties exports of cotton to Germany, for example, have declined from approximately three fourths of her total supply of raw cotton from the United States to only about one fifth from us, while at the same time she is constantly building up an effective bartering system with other cotton producing countries. As suggested by Dr. Aull, it is entirely possible, moreover, that America had much to do with making the time ripe and setting the stage for Hitler, for we all know that men like Hitler are direct results of an impoverished and handicapped nation.

The world at present is consuming an ever increasing amount of cotton, in fact, more than was ever consumed before. But what adds to our already entangled perplexity is the fact that the United States is not benefitting from this expansion of world cotton consumption. We find ourselves, however, in a much more embarrassed position, for where we formerly shipped approximately sixty to seventy per cent of our cotton abroad, we now export only about forty per cent.

## *Farmers Are The Sufferers*

It is readily seen that the direct sufferers of this economic unbalance are the farmers of our

(Continued on page 32)





# BETWEEN THE

## ALPHA ZETA

Alpha Zeta, the national honorary and service fraternity for agricultural students, first came to Clemson in the spring of 1930 when the South Carolina Chapter was organized. Since its beginning at Clemson it has been one of the outstanding fraternities on the campus, having pledged to its membership the agricultural students having the highest records of scholarship, service, and character. Clemson's chapter of Alpha Zeta was organized through the dissolution of Alpha Sigma, a local agricultural fraternity, through the efforts of faculty members.

The purpose of this great national fraternity, having chapters in 42 out of the 48 state agricultural colleges in the U. S., is to promote higher ideals among agricultural students, to encourage scholastic achievement, and to establish a feeling of brotherhood among its members. At Clemson juniors and seniors are taken in twice a year, in the fall and in the spring. Usually the honor sophomore from the school of agriculture is also invited to join the fraternity when invitations are issued in the spring.

Among the outstanding projects promoted or assisted by Alpha Zeta at Clemson have been the Ag Fair which is held semi-annually to display to the public of the state some of the material progress which is being made at Clemson in agriculture; also the Ag Mixer, held annually to welcome the freshman students into the school of agriculture; and a third, the presentation of medals to the honor

## ALPHA TAU ALPHA

Alpha Tau Alpha, the national honorary and professional Agricultural Education fraternity was started at Clemson in 1930. Since then it has become one of the leading honorary fraternities at Clemson, its members coming from the Junior and Senior classes in Vocational Agricultural Education. Since its organization at Clemson, 103 members have been pledged.

There are fifteen chapters of the Alpha Tau Alpha in the United States. The purposes of this fraternity are given in the preamble of the Constitution which reads "In order to develop a true professional spirit in the teaching of agriculture, to help train teachers of agriculture, who shall be rural leaders in their communities, and to foster a fraternal spirit among students in teacher training for Vocational Agriculture, we band together in this professional fraternity." The program of activity for the Kappa Chapter includes:

- Acting as advisors or counselors for freshmen,
- Sponsoring an Agricultural Education department in the school journal,
- Sending representative to the National Conclave,
- Printing a directory of agricultural teachers,
- Giving an annual banquet,
- Contacting Honorary members,
- Giving a smoker for professors.

sophomore and the two highest freshmen in the school of agriculture.





## F U R R O W S

### STAFF MEMBER

A new member of the staff of the Dairy Department of the South Carolina Agricultural Experiment Station is Dr. P. G. Miller, who assumed his duties at Clemson on August 1st.

Dr. Miller entered college at West Virginia University. While he was there he held a creamery job, which developed in him an interest in the dairy industry. He was graduated in dairying there in 1934, and went to the University of Minnesota the following session to study for his Master's Degree. He held a teaching assistantship there, where he worked under Dr. W. B. Combs. His thesis topic was "Accounting for the Fat Placed in the Churn." In 1936, after having received his Master's Degree, Dr. Miller went to the University of Wisconsin on a University Fellowship. The following year he held a research assistantship. He worked under Dr. H. H. Sommer there on the "Heat Stability of Milk," and received his Ph. D. last spring.

Dr. Miller is now working on the "Effect of Feeding Cottonseed Meal on the Physical, Chemical, and Manufacturing Properties of Milk."

Mr. G. H. Dunkleburg, Iowa State College, has been added to the Agricultural Engineering staff to do Research work.

Mr. G. H. Stewart, Clemson grad of '35 has been added to the South Carolina Extension Service staff as Assistant Agricultural Engineer.

Prof. G. B. Nutt of the Agricultural Engineering Department attended the fertilizer convention held in Washington in November.

### FUTURE FARMER ACTIVITIES

The Future Farmer program is a part of the program of Vocational Agriculture in this country and its purpose is to teach group activities to young farmers through active participation.

Many of these activities are stimulated by contests, the money for these contests being provided by commercial organizations that are interested in the welfare of the farmers of the State, their business being with the farmers. Most of the Future Farmer chapters in this state hold Father and Son banquets during the year, often cooperating with the girls enrolled in the home economics classes. Camping is one of the activities carried on by Future Farmers and is becoming more and more important each year, providing the boys with an opportunity to cooperate in something in which they are intensely interested.

The Future Farmer organization provides a stimulus for action through its different degrees provided for in the organization. A beginner is a "Greenhand". The second degree is "Future Farmer". The third step is the "State Farmer" and the fourth degree, the highest stage of advancement is "American Farmer". By the time a boy has reached this stage of the work, he has become equipped for establishing himself as a real farmer. As soon as he is out of the high school, he is ready to enter a part-time class or group, much better equipped to carry on his farming because of his Future Farmer activities.



# RURAL YOUTH-TODAY AND TOMORROW

By Harris L. Beach '39

AS THE barefoot boy plods slowly homeward from a day's toil in a distant field, little do the captains of industry realize the realm of activity for future achievement that is going on in the brain of this youngster.



He realizes the significance of his work and knows that the sacredness of the good earth is intrinsic and inherent. His calloused hands brought about by the tasks equal to his powers show that he does not live an easy life. His poorly clad body gives us a vivid picture of his meager earnings; his stately form and brawniness picture health in the first degree; the expression on his face dispels gloom and pessimism

and displays courage and perseverance along with a world of satisfaction and contentment, and yet these are just a few cardinal points of our rural youth, the backbone of the nation.

## *Lured by City*

Is this boy at the cross-roads of the nation or has he an equal chance with his city "cousins" to make good? Is the city luring him away from the farm, or is the farm voluntarily relinquishing its claim on him by not offering attractive rewards through the main channels of modern comforts, a chance for wealth, and recreational activities? Will the farm let him go or will the farm fight for its chosen son, thereby yielding permanent benefits to agriculture, ourselves, and our posterity?

Do the youth of America regard the old Homestead Place as the German youth regards his ancestral home? In Germany, as in the United States, the farm may be divided among the sons or one may purchase the shares of the others. When the German youth sells out and goes to the city to make his fortune he still has a claim on the farm, because if for any reason he fails in his endeavor he may return to the farm and seek shelter and sustenance. In other words, the German farm is considered a hereditary home. Even if Germany is not at peace

with the world, we will have to admit that she has some good rural tradition and this hereditary home idea is something that we could practice here in America.

## *Cooperation A Key Note*

The future of rural youth is closely correlated with two colonial traditions—individualism and cooperation. In the past we have practiced and been proud of our rugged individualistic ideas, but on account of our modern-day trend of living it is necessary for us to lean toward the tradition of cooperation. The agricultural youth of today may adhere to an ancient adage, "Together we stand and divided we fall" and very probably will be able to compete with youth in industry and other fields. Rural youth has got to fall in line and fight the same battles that other youth are fighting and this writer thinks that cooperation is a good weapon to use. Many folks are saying that rural youth is at the cross-roads of the nation and agriculture is in a devastating condition. Farmers have exploited their natural resources and their greatest asset, land, is the most neglected one, so it is necessary for our sturdy rural youth to come into the picture and do something about this grave agricultural condition.

## *Need More Leaders*

Our rural areas should have more leaders, for without leaders no nation can survive, no business can prosper and no enterprise will grow—thus leadership is regarded as the keynote to success in any line of endeavor. In the past the more wealthy planters have sent their sons to college to be educated, but instead of coming back to the soil to make a livelihood, unfortunately for agriculture, these farm boys have gone into various fields and have left the farm permanently. Will they continue to leave agriculture or will they come back to the soil and elevate farming to a new high level? This is a question which can only be answered by time but one upon which depends in a large degree the future of American agriculture.

The farm boys of today must be the leaders of tomorrow if the farming industry is going to fall in line with other large industries. Never before in the history of America has agriculture experienced a greater transitional period than it is experiencing today and the needs for leadership are greater than ever before.

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# Agronomy Seniors Study Soils in the Field

P. S. LAWTON '39

ON Saturday, October 8th, Dr. H. P. Cooper, Dean of the School of Agriculture and Director of the Experiment Station, and Dr. G. H. Collings, Professor of Agronomy, took their Senior Agronomy class of thirteen students into the mountains of South Carolina, North Carolina, and Georgia to study the various mountain soils. Accompanying the party were Dr. G. B. Killinger and Dr. H. T. Folk of the Experiment Station, and Professor J. W. Jones of the Agronomy Department. This trip was made as a supplement to the studies made in class of the various soil types and series. Dr. Cooper and Dr. Collings felt that a thorough observation and study of the soils discussed in class would be of more value than many indoor classroom recitations. After studying the various soil types they found this to be true. As a result the students began to grasp and understand more readily their theory assignments.

Leaving Clemson at 8 o'clock Saturday morning the group visited localities along a route to Seneca, Walhalla, Highlands and Franklin returning in the later afternoon by Toccoa, visiting Toccoa Falls. The group made stops at the near-by fields between each of the above named towns, as well as along the road side, examining and studying the various soil series in each field. A sample of soil from each of the three soil horizons was taken from the more important soils observed. The group stopped at Franklin to have lunch that was graciously furnished by Captain J. D. Harcombe, the College Mess Officer.

The soil series observed, as pointed out by Dr. Cooper and Dr. Collings, may be listed here. First, the soils located in the mountain foot hills of South Carolina were studied. Those soils observed in the field were of the Cecil, Iredell, and Davidson series. These soils in the order named, grade from a grayish-brown sandy loam through a dark gray loam to a dark brown clay loam. These soils are among the most productive of the Piedmont Section of South Carolina. At the next stop the group observed the mountain soils composed of the Talledga, Chandler, and Ranger Series. These upland soils are characterized by their reddish-brown to yellowish brown B horizons. The rocks from which they were formed are granite and a light colored gneiss. Near Highlands the soil series commonly found above 3000 feet elevation were studied. These soils observed were the Porter, Ash, and Burton Series. This particular group of soils, too, is characterized by its reddish-brown to yellowish



Agronomy Seniors and Professors

brown B horizons, and were formed from schists and granite bases. Beginning near Franklin and extending to Toccoa, the class studied the soils of Sandstone origin. This group is composed largely of Habersham and Hartsell soils. These soils were derived from sandstone, shale, and quartzite. This series is also characterized by its reddish-brown to yellowish brown B horizons.

Aside from the knowledge gained from the study of the various Piedmont and Mountain soils the class thoroughly enjoyed all of the sights seen. Only a few of the many sights observed may be listed here. The Bridal Veil Falls and the Gorges seen near Highlands were thrilling sights to most of the class, especially to the boys from the down state section. The Toccoa Falls, several miles from Toccoa, were especially pretty in the late afternoon as the sun was sinking in the west. These Falls are ten feet higher than Niagara Falls. It is reported that they were formed by a very small stream. The Tallulah Gorge, near Tallulah, surrounded by trees with their leaves of various autumn colors was a beautiful sight. This is a sight which few people see. It is a place where large numbers of tourists stop for souvenirs and to observe the beautiful landscape.

Dean Cooper has said that he expects to make similar trips with the Agronomy seniors to the Coastal Plains and possibly other sections of South Carolina during this school year. The Agronomy Seniors agree with Dean Cooper in his belief that actual observations in studying soils is an excellent method of learning to distinguish the various series. Since everyone concerned is convinced that this method is better than merely studying in a class room, the Agronomy Seniors are looking forward to similar trips in the future.



# Lighting the Milky Way

By G. H. WISE

**W**HAT is the darkest place in the world? If Jonah had voiced his opinion, he probably would have said the inside of a whale. From a different viewpoint the late Governor W. C. Hoard, a pioneer in dairying, ventured an answer. He stated, "The darkest place in the world is the inside of a cow." This statement has stimulated research and challenged the ingenuity of workers in the fields of anatomy, physiology, and nutrition for many years.



"Window-stomach" Calf (Note Circle)

Physical means of exposing a part of the interior of a living bovine to the light of investigation have been developed. The complex conformation of the ox stomach, being divided into four distinct sections, and the great resistance of this species to infection render it possible, by surgical technique, to make a permanent opening through the side into the first compartment of the stomach. This opening, commonly known as a "window", permits the inspection of the first two stomach compartments. Only in recent years has this method been used to study the physiology of digestion.

Seven dairy calves having permanent openings into the first section of the stomach, or the rumen, were used by the Dairy Department of the South Carolina Agricultural Experiment Station to study the factors affecting paths followed by the milk in its journey to the pail from the fourth compartment or true stomach. Nature apparently designed the first two sections to handle the rough work, the preliminary break-down in digesting coarse feeds. Observation through the private windows has revealed that under certain conditions nature's most

refined food product, milk, is accidentally detoured into the "crude" sections. Milk, being unable to find its way out, becomes contaminated by association with the residents of the roadside inns. The ultimate result is a disturbance, digestive of course. No calf sanctions such behavior. Hence, the ultimate object of the investigation is to learn to help maintain the health of the calf by keeping the milk in the proper channels as it is swallowed.

Though thus far a beam of light, illuminating several recesses of the stomach of the calf, has revealed some of nature's secrets about what takes place, much remains to be discovered. It is proposed to pursue the work further in order to discover some of the more fundamental causes of the physiological functions observed.

Since the normal suckling period of a calf is restricted to the first several months of its life, the experimental stages are confined to these earlier months. During this period the calves apparently

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# Some Trends in Vocational Agricultural Education

By W. H. WASHINGTON,  
Dean, School of Vocational Education, Clemson  
Agricultural College

THERE are a few significant changes in vocational agriculture that may be considered as outstanding. Many people think of the high school of today as being the same thing it was when they attended ten, twenty, or thirty years ago; and they think of the subjects as being the same as they studied. Some admit that insignificant changes have been made, but that most of these have been of an unfavorable nature.

The progressive public school of today is as different from the school of thirty years ago as the "V-8" is from the "Model-T". There are changes in practically every single department of the public school. The content of many of the subjects has undergone a revolutionary change. The method of teaching has changed and the number of subjects has been tremendously increased. Even with that there is a lag between scientific advancement and certain social changes and the school.

Public school agriculture, which had its beginning before the passage of national legislation giving aid for this work, has changed as much as many of the other subjects. I will mention a few of these changes as indicating the general trend which is still underway.

1. *Vocational agriculture in the high school is no longer limited to the forty-five or ninety minute period and to the boys of fourteen years of age or older regularly enrolled in four high school subjects!* It is literally open to anyone who is engaged in, or preparing to engage in farming. In this State last year, there were 8077 regularly enrolled high school boys, 2719 part-time students—that is, young men who are not in attendance at the public school as they are ordinarily considered—and there were 15,145 farmers enrolled in evening classes. All of this work is a part of the public school. It is authorized by the State and County School Boards of Education and approved by the local Trustees and under the general supervision of these authorities and the local Superintendents of Schools. This trend is a tendency to extend the opportunity of studying vocational agriculture to all who desire it. The whole South is making rapid advances in this direction.

2. *Vocational Agriculture is developing a content of its own.* In the early days, the teachers of agriculture were without appropriate vocational content of an authoritative nature. The subject con-



Clemson's Student Teachers

sisted largely of isolated bits of other subjects. For instance, the teacher was required to have in his school a certain number of beakers, test tubes and other chemical apparatus. Naturally, he thought he was expected to use this equipment in teaching; and he became, in part, a teacher of chemistry. He seldom tied the chemical subject matter up with the farming operations of the students and of the community. Now the supervised practice, or the home farming programs of the students, whether they be all-day high school students, part-time youths, or adult farmers, is the core of the agricultural curriculum and agriculture is developing a content of its own. It must depend upon many of the sciences for technical details; but the big problem is the integration and application of these sciences to the individual farm represented in the class, rather than the mastery of the scientific skills and details of so many sciences that contribute to agriculture.

3. *There has been a general change within the scope of agriculture as it is outlined in the teaching programs.* For example, a few years ago, the program might be first year Field Crops, second year Animal Husbandry, third year Horticulture, and fourth year Farm Management. In applying this kind of program to the solution of problems as they arise in the supervised practice or home farming carried on by the students difficulty was experienced. Few farmers operate single enterprises. A scheme like that described above gave little or no place for Farm Shop and other Agricultural Engineering needed on the farm. Today, an analysis of the farming operations includes credit, cooperation, etc., for

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# GROWING GARDEN CROPS IN WATER

C. C. MILEY, '39

FOR the past two years, the growing of plants in water instead of in soil has been given an immense amount of publicity. This process has been described under various names as "tank farming", "tray agriculture", "bathtub farming", and "hydroponics", a term meaning to work with water. The water culture method consists of growing plants with their roots in a water solution which contains the minerals necessary for plant growth.

The growing of plants in water is nothing new. It all started when scientists turned to chemistry for the answer to the age old question, what is a plant? Nearly a century ago, scientists discovered that certain chemicals in the soil are plant nutrients. In trying to find out what these chemicals were scientist began to analyze soil and water along with determining the composition of plants. Many investigators have used the water culture method to study the influence of factors of environment on plant growth. A large amount of valuable information has been thus obtained.

## *Remarkable Experimental Results*

Until recently this method of growing plants in water was merely a tried and true method of scientific observation. About 1929, Dr. W. F. Gericke, plant physiologist at the University of California, suggested that plants might be grown on a large scale by the water culture method. Dr. Gericke conducted a number of experiments outdoors and within the greenhouse to determine the technique which might be used. He constructed shallow tanks and lined them with asphalt. Across the tanks he stretched chicken wire and on top of the wire placed a layer of peat. He filled the tanks with moderately acid water containing the minerals necessary for plant growth—relatively large quantities of phosphorus, nitrogen, and potassium, and relatively small quantities of sulphur, iron, boron, manganese, magnesium, zinc, and copper. Dr. Gericke set young tomato plants in the peat with the roots reaching through the wire into the solution. The plants grew vigorously and rapidly. When mature, Dr. Gericke had to pick the fruits with a step-ladder. At the conclusion of the experiment the yield of fruit per tank was computed as yield per acre. Dr. Gericke's tanks were exactly one-two-hundredths of an acre in size. By weighing the fruit produced in one tank and multiplying that by 200, he was able to find the yield per acre. On an acre basis the yield averaged about

80 tons per acre. Similar results were secured with Irish potatoes. The yields averaged about 2500 bushels on an acre basis. These enormous yields appealed particularly to writers of popular literature. These writers compared yields with those of crops grown in the field. For tomatoes, 80 tons by the water culture method in the greenhouse, against an average of 10 to 15 tons in the field. For Irish potatoes, a yield of 2500 bushels by the water culture method against a yield of 100 to 125 bushels in the field. This comparison looked good in print and consequently the water culture method received much publicity. Those accounts undoubtedly left the reader with the impression that a new discovery had been made which might revolutionize our present system of agriculture. These writers failed to make proper comparison. The yields in the greenhouse for a whole year were being compared with yields in the field for a relatively short time. Furthermore, the plants grown in water in the greenhouse were

(Continued on page 35)

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# Clemson's Berkshire Herd

By W. LAMAR EIDSON, '40

THE Clemson Berkshire herd has made so much history in recent years that people are inclined to think that they have always had good hogs at Clemson—such is not the case. Up until 1920 there were no definite plans concerning the development of the Clemson herd of swine for showing at the State Fairs. Neither were there any suitable swine at the college for the students to judge.

About the time the men at Clemson were considering improvement of their herd, there was a change taking place in the Berkshire type. The most progressive breeders were turning to the larger type with the straight nose. The first breeders to produce this type were the Parker Brothers, of Niles, Michigan. The Parker brothers are college men, students of genetics, and they have also had valuable practical experience. They have a splendid reputation as breeders of swine. In 1921 a boar and two gilts were selected from Parker Brothers herd and brought to Clemson College.

The mating of one gilt that was brought from Parker Brothers did not make any distinct contribution to the future of the herd. Fortunately, however, the mating of the other gilt proved to be a great success, and it was from these two hogs—Clemson Baron and Clemson Baroness—that the whole Clemson show herd has been built.

There were many reasons for building a good show herd at Clemson. The Animal Husbandry professors wanted animals as near ideal as possible for the students to judge, so they could have a good idea of what a well-bred animal is like. In improving the herd at Clemson, good hogs were brought into the sections surrounding Clemson, thus we have a great contribution to the improvement of local hogs. A good show herd furnishes excellent advertisement for the Animal Husbandry Depart-

ment, as well as Clemson as a whole. Also, in an indirect way, it stimulates the interest of various alumni in the work done at Clemson. One of the greatest reasons for wanting a good show herd at Clemson is to prove to the skeptical public that Colleges are not all theory and that their work has a very practical application.

The Berkshire herd at Clemson has been hailed by many of the leading judges of swine as the greatest show herd in the United States. It has a record that has not been surpassed by any herd of Berkshires in this country. For instance, out of a possible 600 first places, the Clemson herd received

450, or 75 per cent of all first places competed for; out of a possible 254 championships the Clemson herd has received 158, or approximately 62 per cent of all championships competed for, besides a large number of second and third places. The percentage wins in a case like this is not nearly so important as the fact that these hogs have been con-



One of Clemson's Champion Berkshires

sistent in taking honors in competition with the best herds shown by Indiana, Illinois, Iowa, and other States that are the leaders in the production of swine.

Since people have recognized the quality of the swine at Clemson the herd has furnished hogs for many judging contests for club boys and girls and college students. This is an excellent method of instilling in the mind of the student the type, quality, and conformation to be expected in well-bred animals.

Clemson's hogs have done a great deal to popularize the Berkshire breed. Breeding stock from this herd has been shipped to every State east of the Mississippi with the exception of Maine, New Hampshire, and Vermont, and to eleven States west of the Mississippi. This is proof of the quality that

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## THE FIVE ACRE COTTON CONTEST

By L. S. BOSARD, J. C. HARDEE, '40

A SURVEY of the cotton mills of South Carolina made in 1926 showed that the mills were using one inch staple cotton. At this time the cotton farmers of South Carolina were producing cotton with a staple less than one inch. This meant that we were selling our cotton to other states and importing cotton from western states to be used in our own mills.

At the same time a survey was made to determine the average yield in pounds of lint cotton per acre for South Carolina. Our yield was only 152 pounds per acre. This survey indicated that the average South Carolina farmer was producing cotton unprofitably. He was neither meeting the demands of the cotton mills nor growing cotton on a profitable basis.

In 1926 the Clemson College Extension Service began the Five Acre Cotton Contest. The Extension Service with the cooperation of the cotton mills provided \$2,000 in annual premiums to be given to those South Carolina farmers making the highest yield on five acres of cotton. The main object of the contest was to encourage farmers to produce more pounds of better quality, and longer staple cotton per acre.

Heretofore many farmers had the opinion that they could make a greater yield per acre with 7/8 inch staple cotton than with one inch staple cotton. The results of the contest as given in the following table should convince the farmer that greater yields and profits were made with the longer staple cotton.

Because of the lack of funds there was no cotton contest held in the years 1932 and 1933. The contest was again started in 1934 and has been sponsored yearly since that time. There were 1122 contestants entered in the 1937 cotton contest and 76.8 per cent of those who entered carried out the instructions and demonstrations and turned in complete records of their practices and yields. This is clear evidence of the interest which farmers have taken in the contest. Some farmers who have always grown cotton say that the value of things which they have learned about the production of cotton is far greater than any prize which they can expect to win in the contest.

In past years some farmers considered fertilizing and seeding practices the most important factors determining crop yields. At present it is definitely

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## Treating Green Wood With Copper Sulphate

A GENERAL report on the treatment of green woods with a solution of copper sulphate was recently compiled by Professor A. R. Reed of Clemson's physics department. It consisted of observations made on fence posts and telephone poles for a period of January to October, 1938. A great deal of interest has been aroused concerning this treatment, and several experiment stations are investigating its value.

Dr. Wilford and Mr. Kohl of the Appalachian Forestry Experiment Station, Asheville, N. C., are given credit for the discovery of the fact that green wood will absorb and distribute water soluble poisons which due to their toxic effect on fungi and insects, increase the serviceable life of treated wood several fold.

Mr. Turner and Mr. Nettles of the S. C. Extension Service have been cooperating with Mr. Reed in experimental work designed to produce a serviceable fence post at low cost and small labor. They have tried several methods of treatment on pine, black-gum, white heart cypress, and oak, several of which proved very promising. The chief obstacle now is to find a general method which will be suitable for commercial use. The U. S. Department of Agriculture is promoting further research

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Copper Sulphate Treatment on Pine



# "Super-Perfect Milk"

By L. M. RHODES, '39

THERE is no better milk produced than that which comes from the Clemson College Dairy.

Having heard this bandied about by a number of tongues on the campus and elsewhere, it seemed that a little investigating would be in order. Consequently, access to the records on bacterial counts was gained. By comparisons with the score card for milk recommended by the Bureau of Dairy Industry, some truly remarkable facts were revealed.

## "Better Than Perfect"

Forty-one weekly reports of bacterial examinations made this year have been sent to Professor J. P. LaMaster, Head of the Dairy Department, by Professor W. B. Aull, Professor of Bacteriology. Twenty-two samples (53.6 per cent) have had less than 100 bacteria per cubic centimeter. The score card mentioned above, which allows 45 points to milk perfect on bacteria, allows this score on milk having less than 500 bacteria per cubic centimeter. Thus, bacteriologically speaking, it may be said that over half of this year's milk has been more than five times better than some milks which are judged to be perfect.

Only six times in 1938 has a bacterial count cut the perfect score, 45 points, and only once has the count risen sufficiently high to cause a drop of two-fifths of a point in its score on bacteria.

## Mechanical Milking

This superb quality milk is produced from a herd comprised of registered Holsteins, Jerseys,

and Guernseys. These high producing cattle are mechanically milked three times a day in tandem stalls. When the milk is drawn, it flows into a glass container suspended on a pair of scales. After the weight of each cow's contribution is recorded, it flows through a pipe to a pre-cooler and then into a 320-gallon pasteurizing vat. Incidentally, this was the first vat of its size and kind in the world and was built especially for the college dairy. It is in the room next to the milking parlor.

Milk from noon and night milkings is held in this vat until the next morning's milk is added. Then the milk is pasteurized at 142°-145° Fahrenheit for 30 minutes. After pasteurization the milk is cooled to 50°. The only contact made with the atmosphere comes when the milk is drawn from this vat into ten-gallon cans to be sent to the mess hall for cadet consumption. This contact lasts only a few seconds.

(Continued on page 36)

## Uniforms

# WILLIAM C. ROWLAND

## Military Equipment



The Herd in the Feeding Barn

## FOR FINE FRUIT TREES

and ornamental plants write to

# FRUITLAND NURSERIES

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Augusta, Ga.



# Beautifying Our Highways

By B. A. PEELING, '39

WITHIN the past eight years large-scale highway beautification projects have been progressing rapidly. This is the first time in the history of man that highway beautification has been done on public roads by public agencies. Highway departments have realized that this work makes for more enjoyable driving and increases the number of tourists visiting their states. In some states there are laws against placing billboards within certain distances from the highways. Our national government has also realized the need of road-side beautification, and of the money it appropriates to the states for highway work, at least one per cent must go to highway beautification.

In most states native trees and plants are used in these projects. Men are sent out into the woodlands to obtain good specimen trees and plants that are suited for transplanting. After a tree or plant has been selected it is dug with care during the fall and planted in its designated place. The selection of these trees must be done by persons skilled in year-round identification, in order that the correct kind of tree will be obtained. The other plants are secured

from nurseries which submit sealed bids. The lowest bidder does not always receive the contract because all plants must meet the standards set by the American Nurserymen's Association.

## *Projects Successful*

One of the first highway beautification projects started in the South is located between Greenville and Leland, Mississippi, a distance of about ten miles. This project has been such a success that similar projects are now under way, or have been completed, all over the country. Some state highway departments have a Forester or Horticulturist in charge of this work. In other states the work is carried on under the supervision of the maintenance bureau of the highway department. Most states have a Landscape Engineer and one or more Assistant Landscape Engineers to plan these beautification projects.

Most of these projects have been demonstrational in nature in order to interest people in the

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Honeysuckle on Bank Prevents Erosion



Valley Ditches on Highway

# Riegel

On The Up-To-Date Farm—  
Registered Cattle  
Tested Seed  
Modern Equipment

AND

On The Up-To-Date Farmer—  
RIEGEL SHIRTS



# MODERN COTTON PICKING

By A. F. BURGESS & FRANK E. ROGERS, Jr., '40

AS WE find ourselves in the midst of the Machine Age, there seems to be a commendable trend toward mechanical farming. Today, practically everything that has been done by hand or by old-fashioned methods of farming, can be done, and is being done, by machinery. One big draw-back to mechanical farming, however, is that labor-saving devices must be adapted to suit certain farming areas. For instance, very valuable, fertile, farming areas are occasionally found to be too steep or hilly to make farm machinery operate profitably. But excluding this and other very few exceptions, farm work may be carried out mechanically.

What once seemed almost impossible on the farm was to pick cotton with machinery. But now it appears that even this dream has been realized, and already cotton has been satisfactorily picked with mechanical harvesters; however, more improvements are still necessary on this kind of machine.

## Many Difficulties

There are a number of difficulties which immediately present themselves in opposition to the manufacturer of a practical cotton picker. To begin with, the cotton does not all mature at one time. In addition to this, there are variations in types of cotton plants, and also variations in habits of growth of the same type of plant from season to season and in different kinds of soil. Furthermore, the height of the plants, and their spread of branches, vary greatly. Another handicap in the development of a mechanical cotton picker is the fact that the time for testing such a machine during each harvest is limited, and, therefore, a year must pass before alterations and improvements may be experimented with.

Aside from field problems which must be solved, the following basic requisites must be achieved:

1. It must harvest a high percentage of the

mature cotton, with a minimum dropped on the ground.

2. It must not seriously damage the cotton, so that the highest possible grade of ginned cotton may be obtained.

3. It must not seriously damage the plants or the immature cotton bolls.

4. It must have sufficient capacity to make its operation profitable, as compared with hand picking.

5. It must gather as clean a sample as possible, with a minimum amount of leaves, stems, hulls, weeds, etc., entrained in the lint.

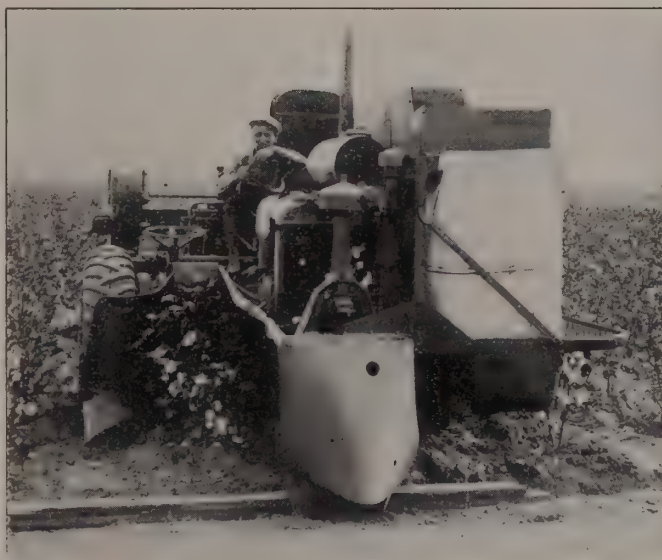
6. It must be mechanically sound in design so that it will provide satisfactory, consistent, and dependable operation, and must be simple enough that both the operation and the ordinary servicing of the picker can be done by farm labor.

7. In order to afford most profitable utilization, the mechanical harvester preferably should be an attachment for farm

tractors rather than a selfpropelled machine, so that the tractor may be available for other purposes.

These reasons partially explain why the early

(Continued on page 37)



The Mechanical Cotton Picker

## CLEMSON COLLEGE ROAD-SIDE MARKET

Open April 15th to December 15th

We sell 115 varieties of peaches, 75 varieties of apples, and many varieties of grapes, plums, cherries, raspberries, dewberries, pecans, etc. Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

The Horticultural Department, C. A. C.



## THE BOX SILO

A successful type of inexpensive silo was the college Dairy Department's answer to an urgent need for additional ensilage space last fall.

Designed by J. P. LaMaster, Head of the Dairy Department, the silo was built to contain about 175 tons of sorghum and soybean silage to meet both the emergency and the need of farmers for an inexpensive silo. Entirely above-ground, it consists mainly of 6" x 6" posts, 2" x 4" stringers (horizontal bands about the box), and the walls of the box, made of vertical 1" x 10" planks covered on the inside with a layer of tar paper to exclude air.



The Clemson box silo measures 12' x 12' in cross-section dimensions and is 60 feet long. The wall planks were dressed, a detail which might be dispensed with on the farm. After cutting, the silage was blown into the silo with an ordinary blower

type silo filler. When it had packed, it was covered with wet oat straw in which oats was later sown. Feeding the silage was made easy by knocking out one end of the silo and carting the silage to the feeding troughs. About 8 inches of spoilage occurred at the top. The only difficulty encountered was a decrease in palatability, probably due to leaching from the decayed straw on the surface. The total cost of the silo, including labor, was about \$150.00. This cost does not include a roof, added later. Figuring the cost of storage, we arrive at less than one dollar per ton capacity! Furthermore, the silo's use is not limited to one year.

### *Construction Cheap*

Farm labor can be used in constructing the box silo, and the lumber can be obtained largely on the farm. Dr. George H. Wise, Associate Dairyman with the Dairy Department of the South Carolina Agricultural Experiment Station, says, "I think the farmer can construct a silo of this type that would take care of more than one ton of silage per dollar cost of construction, even with the roof."

## Mountain View Milling Co.

Seneca, S. C.

Manufacturer of High Grade  
Poultry and Stock Feeds

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Yellow Corn





# CAMP LONG

About ten years ago, C. Lee Gowan, County Agent of Aiken County, with the support of local people, succeeded in arousing a great interest, in establishing a permanent camp for Aiken County 4-H Club boys and girls. In 1930, Mr. Gowan and Dr. W. W. Long, the late director of the Extension Service, and others interested, visited a number of prospective spots in Aiken County and selected the beautiful spot, which was to become the site for the present Camp Long.

As a result of the intensive interest of Mr. and Mrs. Monson Morris of New York and Aiken, \$500 was donated by the latter in 1930, which was put in the hands of a board of trustees and deeded to Aiken County, for the purchase of the original tract of 50 acres of land. This land, which later became the state 4-H Club Camp, was deeded to Clemson College to be developed and operated under the supervision of the Extension Service. Many interested Aiken winter residents also made donations, which were used for the clearing the grounds and constructing the first buildings. The dam, however, was built with the funds appropriated by the Aiken County legislative delegation.

Since 1932, by receiving federal funds through relief projects, the buildings have been completed, the lake enlarged, grounds beautified, water and sewerage systems installed and new tracts of land purchased, increasing the camp's area to 288 acres. The camp was very appropriately named "Camp Long" in honor of Dr. W. W. Long, whose effort made it possible to develop these opportunities for the rural boys and girls of South Carolina.

Camp Long entertained its first group of campers in 1933. Since that time the camp has been steadily growing, and at the present time it entertains from 2000 to 2500 4-H Club boys and girls who attend every summer for the training, recreation and inspiration received at the camp.

Camp Director Romaine Smith and his staff plan to improve Camp Long by further landscaping the grounds, improving the nature trail, building a handicraft room and workshop, constructing a nature museum, making collections of handicraft exhibits and developing a rock garden and water plant.

The camp is equipped to take care of two hundred and forty campers during each camping period. Seventeen log buildings, including three sleeping cabins and one large bath house for boys and similar quarters for girls, dot the hillside about the lake. The permanent camp staff has a large counselor's lodge which serves as their home during the summer camping season. Among the other camp constructions are a large recreational hall, provided for assembly programs, a spacious dining hall and kitchen, and a lodge for county agents and their families.

Among the many interesting features enjoyed by the campers are the evening vesper services and campfire programs held at the beautifully constructed stone circle, the most outstanding spot of the camp, which is located in a grove of trees overlooking the lake. The lake is equally as important in offering recreational advantages. During the last season 262 boys and girls learned to swim;

(Continued on page 38)



Water Sports at Camp Long



# World Famous Bull at Sand Hill Station

**S**AUGERTIES Royal Sequel, sire of the world's record Guernsey cow and the greatest production-transmitting bull of the Guernsey breed, is now being used at the Sandhill branch of the South Carolina Agricultural Experiment Station. This is made possible through a cooperative project between the Experiment station and the Bureau of Dairying Industry, United States Department of Agriculture.

Ten years old, Saugerties Royal Sequel has sired nineteen tested daughters who produced an average of 13,344 pounds of 5.2 per cent milk in the equivalent of one year. The average amount of butterfat produced was 694.3 pounds, equivalent to 868 pounds of 80 per cent butter. The average production factor was 142.1. This means that the average amount of butterfat produced was 42.1 per cent higher than the average amount produced by Guernsey cows in general, the amount called breed average. It might be added, however, that "breed average" must be computed on the basis of production of tested cows only, and that not all register-

ed cows are tested. Thus it is evident that "breed average" in the common sense is much higher than true breed average.

## *Daughter's Record*

Cathedral Rosalie, one of the daughters of this great animal, was included in the summary above. Her record was 23,714.5 pounds of 5.1 per cent milk, or 1213.1 pounds of butterfat. Her production factor was 213. In the year in which this record was made, the butterfat she produced, if churned, would have made an average of more than 4.15 pounds of 80 per cent butter a day.

The wonderful records of the daughters of this bull are by no means freakish, because his pedigree indicates that he inherited potential producing capacity from both his sire and his dam.

## *From Famous Dam*

The dam of "Sequel" was Shagbark's Dorothy, with a record of 823.4 pounds of fat in class D, former holder of seventh place. Her sire, Florham

(Continued on page 39)



PLANT BREEDING EXPERTS

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WESTMINTER, S. C.

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## Better Farm Buildings for South Carolina

By W. J. OATES, '40

ONE of the greatest needs for improvement on the average South Carolina farm lies in the problem of farm buildings. Almost every farmer has a space of shelter of some kind for his animals; however few have adequate space for the storing of feed and tools.

The maintenance cost for animals is directly dependent upon the type of housing which they are given. Even though almost every farmer has some type of shelter for his animals, very few have buildings suitable to withstand any severe change in climatic conditions. Any farm building, when built for good appearance and greatest service at the most reasonable cost is one of the most valuable assets to a modern farm. Such a building will more than pay for itself in the amount of labor and feed that is saved. Since the animal body requires a certain amount of food to give it heat and energy, it is easy to see that if farmers will furnish warm, comfortable quarters for their animals, these animals can use most of the maintenance food to help the farmer realize a greater profit. Comfortable quarters will also bring about a reduction in the amount of food required for the stock. This reduction in feed required will also help the farmer to realize a greater profit from this investment.

There are many factors to consider when planning farm buildings. Some of these factors are: size, convenient location, safety, neat appearance, construction material, and constructing cost. Size is a very important factor. The farmer must anticipate the amount of feed and storage space that he will need. All farm buildings should be conveniently located with respect to the farm home. Fire proof materials such as stone, brick, concrete, or tile should

## Japanese Beetles in South Carolina

By L. G. HANNA, '40

Yes, there are Japanese Beetles in South Carolina. We commonly associate the Japanese Beetle with fruit growing states such as Florida and California, because of the much publicized quarantines to which likely infested produce from these States have been subjected. Nevertheless in this little pest, we have a potential enemy of South Carolina farmers.

In 1937 positive results were shown by trapping in two sections. Greenville and Charleston districts were the ones slightly infested. Due to the comparatively small number of these insects in South Carolina, we can, by constantly keeping on the alert for their appearance, keep them under control. The adult beetle is one half inch long with a green head and thorax and possibly a bronze tinge, brownish wings and with two white spots at tip of abdomen.

Reproduction consists of only one generation a year. They appear in June, and become most abundant in July and August. They decrease in activity, finally going into the ground as cold weather approaches, where they stay until April when the life cycle is completed.

Control methods vary with plant affected. For ornamental plants and non-bearing trees, a combination of arsenate of lead paste with two per cent of lead oleate will furnish adequate protection. As is the case with all insects and diseases, prevention is the best remedy; Therefore let's cooperate in preventing this insect from becoming economically important in our state.

be used wherever practical; however the choice of material depends largely upon the owners' preference.

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# FROM THE DEANS

In his will providing for the founding of this institution, Mr. Clemson stated that his purpose was to "establish an agricultural college which will offer useful information to farmers and mechanics." The first board of trustees, following this suggestion, decided to call the institution "The Clemson Agricultural College" thus indicating by its very name the important place which agriculture was expected to have in its operation.



Dean Cooper

Although engineering has from the beginning been elected by a large share of the students, and although textiles, chemistry, general science and vocational education which developed later, have also attracted their share of students, Clemson is still regarded primarily as an agricultural college. The total number of agricultural graduates who have gone out exceeds the number of those who have graduated from any other school of the college.

It is fitting therefore that a journal be established which will provide a medium of expression for agricultural students and those responsible for its coming into being deserve to be congratulated for their vision and perseverance.

In addition to furnishing a means by which students may give expression to their ideas about things agricultural, this journal should be of value to them for several other reasons. First, there is the training in the art of writing which a larger number of students will receive than has been the case heretofore. Since the ability to write has been said to be the greatest shortcoming which handicaps college students of all kinds, and students of agriculture particularly, the larger the number of the latter who avail themselves of this training the better it will be for them,—and for agriculture. In this connection it might be pointed out that there is a considerable field of agricultural journalism which does not seem to be particularly crowded and for which work on a publication like this is good training.

Then there are the managerial aspects of such an enterprise which furnish excellent experience to those who secure the necessary advertising and



Dean Washington

As this Journal makes its appearance, I wish to extend to it as a publication and to its staff my heartiest congratulations and best wishes.

In attempting to produce a publication of this character, the students of Agriculture and of Vocational Agricultural Education deserve a great deal of credit. The venture, in my opinion, is a far-sighted educational plan. Even though the radio and the cinema are taking an ever-increasing part in the dissemination of information, and we think that practical television is just around the corner, journalism has not lost its place; but it seems to me that it will have an ever-increasingly important function to perform for society.

Students in a technical field and students in a professional field will have in the publication an opportunity for preparing and editing material of a technical and professional nature. This type of publication will require a degree of accuracy and completeness that may be disregarded, more or less, in a publication which deals with general short stories or non-technical subject matter. Agricultural workers are called upon to prepare technical papers, both for delivery and for publication, which are means not only of extending their ideas to others, but also serve as a challenge to other workers in the field to check and double check, if you please, their efforts.

Likewise, the vocational teacher must prepare technical subject matter or subject matter that has been developed through a scientific laboratory for consumption by students of Vocational Agriculture who are, in many cases, not trained in scientific technique. This means that he must be able to read and understand the scientific phases of agricultural readings and that he, in turn, must be able to interpret the findings of these scientific workers in terms so clear, so simple, and yet so accurate that they may be understood by persons whose general educational level is often below that of the seventh grade.

It is hoped that this Journal will provide a "writing laboratory" for students of Agriculture

(Continued on page 39)

(Continued on page 39)



## Green Manure Crops

By J. M. BAKER, '40

Although the practise of turning green-manuring crops into the soil for the purpose of increasing crop yields dates back to 300 B. C. when the Greeks turned under broadbeans (*Vicia faba* L.) for this purpose, today the average farmer in South Carolina does not realize the importance of this practice. Because of this fact, many dollars are lost each year by the farmer who could save this if he would systematize his farming practices so as to include a green-manuring crop in his rotation. For many years the Agronomist of the United States Department of Agriculture have been recommending the use of green-manuring crops, and today they are emphasizing this practice more than ever before.

The primary reason for turning under green-manuring crops is to keep the organic matter of the soil at a constant level. It is very important that we do this because there is a direct relation between the organic content and the productivity of the soil.

Green-manuring crops also improve the physical condition of the soil which is of great importance in the control of erosion. Green-manuring crops tend to prevent soil erosion in two ways. While the crop is growing, the plant canopy acts to protect the soil from the impact of rain, and to retard the run-off; and after the crop is turned under, it increases the permeability of the soil, thus enabling the water to soak in more rapidly, with a resultant decrease in run-off and erosion.

Both legumes and non-legumes are used as green-manuring crops. The chief difference between them is that legumes add organic matter and nitrogen to the soil, whereas the non-legumes add only organic matter. Sometimes in maintaining the soil organic matter, a bulky crop is preferred and often times a non-legume such as sorghum or rye may serve this purpose best, but there are certain limitations in using non-legumes as green-manuring crops. If a non-legume is turned under directly before another crop is planted on the soil, the micro-organisms that break down the organic matter is liable to use all the nitrogen in this process and thus cause a nitrogen deficiency in the latter crop. If a non-legume is turned into the soil preceeding the planting of another crop, it is advisable to add some nitrogenous commercial fertilizer to the soil to prevent a nitrogen deficiency. Legumes do not draw upon the soil nitrogen when turned under as green-manuring crops, and for this reason, they are often preferred.

## Many Dairy Alumni Take Graduate Work

CLEMSON alumni from the Dairy Department have distinguished themselves by the high percentage of their number who have continued their study at other institutions.

Out of 120 graduates who have finished during the past seventeen years, sixteen have taken graduate work elsewhere, according to departmental records. This is 13.33 per cent of the total, or two out of fifteen. The average number of dairy graduates during this period is slightly more than seven per year. At one time the percentage of graduate students among the alumni was twenty.

### *To Many Schools*

Alumni have gone to many schools. The University of Maryland attracted three, who were among the first five. Other institutions attended include the University of Missouri, three alumni; and Cornell University, two. Also each of the following institutions has been attended by one alumnus: Iowa State, Michigan State, Pennsylvania State, University of California, Virginia Polytechnic Institute, the Universities of Wisconsin and Minnesota, and the South Carolina Medical College.

### *Studies Valuable*

A consideration of the present occupations of these men shows the value of their continued study. They are engaged in part as dairy farmers and plant operators. The rest are distributed, one each, in the fields of farm demonstration, farm superintending, agricultural teaching, county agent work, assistant school superintending, dairy extension work, medicine, and dairy research. Dr. George H. Wise, who received his Ph. D. at Minnesota, is the one research worker. He is Associate Dairyman with the Dairy Department of the South Carolina Agricultural Experiment Station, and is located at Clemson.

The others mentioned are scattered south to Georgia, north to Pennsylvania, and west to California.

The development in the United States of the largest superphosphate industry in the world was the result of the discovery in 1867 of the superior South Carolina rock phosphate.

Some of the common green-manuring crops in the South are:

**LEGUMES**—Cowpea, Soybean, Peanut, Alfalfa, Winter Vetch and Velvet Beans.

**NON-LEGUMES**—Rye, Oats, Mustard, Buckwheat, Rape, and Turnips.



## THE CLEMSON POULTRY PLANT

**D** ID you know that there have been many 300 egg hens, among the elite of the poultry world, raised by the Clemson Poultry Department. To get accurate records on the 2000 hens kept at the plant, that have reached a maximum production of 100 dozen eggs a day, one man spends his entire time operating the trapnest and recording the eggs that each hen lays. The eggs are carefully marked and the chicks identified as to parentage so that pedigrees can be kept. By intelligently studying these records, it has been possible to select breeders with the ability to transmit high egg producing qualities to the offspring.

On the thirty-five acres of land situated three-quarters of a mile from the college on the Pendleton road, are forty-two structures consisting of laying houses, brooder houses, range shelters, and the accessory feed houses and management buildings. 4,000 to 5,000 chicks are hatched and raised each year. Of the many breeds of chickens in the world, only the three leading breeds of South Carolina; namely, White Leghorn, Rhode Island Red, and Barred Plymouth Rock, are kept at Clemson. The limited number of breeds makes it easier to keep pedigrees and conduct breeding experiments.

### *Sanitary Program Enforced*

A complete sanitary program is enforced to maintain health. To eliminate flies, a vigorous campaign is waged since flies carry worms as well as microorganisms and viruses. Annually the breeders are tested for pullorum disease, a disease transmitted from the hen through the egg to the chick. Last year less than one-half of one per cent reacted to this test. The hens and growing stock have access to ranges on which Bermuda grass and lespedeza form the sod. Rye grass is added to the sod in the winter. Sanitation is maintained by rotating the ranges.

### *Feed Studies Made*

Although considerable work is being done on range paralysis, the experimental program deals primarily with feeding rations for growing chicks and laying hens. It has been found that high quality cottonseed meal is an efficient protein for growing chicks as part of the protein in the ration. However, cottonseed meal is not desirable in a laying mash because it discolors the eggs. Studies are being made on the effect of feed on quality of eggs, mineral metabolism, and the use of oats, soybean oil meal

(Continued on page 39)

## Horse Shows in Oconee and Pickens Counties

By JOHN M. LYNES, '39

Do you know that there are more than 500 brood mares in Pickens and Oconee Counties?

About two years ago the farmers in these two counties became conscious of the enormous annual cash outlay for the purchase of workstock. At this time cotton acreage was reduced and more land was available for growing feed crops and pastures.

The farmers, county agents, Smith-Hughes High School teachers and bankers all got together with the idea of solving this economic problem. The farmers wanted to know why these mules could not be grown in South Carolina just as well as in Missouri, Kentucky, Tennessee, and Texas. The answer to this question was simple. If they could grow their feed crops and pastures economically they could most surely raise mules. Moreover, the mares could be used in making the crop while raising these mule colts.

During the past two years there have been more than 200 brood mares purchased in Oconee County and more than 200 in Pickens County. Each county has also purchased two jacks and two stallions.

### *Largest Show Ever Held*

On October 14th there was a horse and mule show at Westminster, Oconee County. This was probably the largest draft horse show ever to be held in South Carolina. Hundreds of farmers were present and they were all intensely interested. Traffic was stopped and the streets were roped off for the horse show. Imagine 70 mares being shown in one class; that is what happened. The judges had quite a task in selecting the four top mares in the ring. There were also 35 home-raised mule colts competing for honors.

### *Family Class Interesting*

Probably the most interesting class shown was the family show. There were seven mares with their families at side. This family class demonstrated that there were a few farmers who had for several years been raising their own work stock.

On October 12th there was a Pickens County Horse Show at which there were about 40 mares and colts exhibited. The show was quite similar to the Oconee County Show. An interesting feature was the stallion show, there being two outstanding Percheron stallions exhibited. The stallions, mares, and colts were all paraded through the streets of Pickens.

(Continued on page 39)



## POLLED HEREFORDS BECOME POPULAR

CLEMSON COLLEGE has been breeding Hereford cattle for more than a quarter of a century, but no Polled Hereford blood was used in the herd until 1926. The first polled bull used was Charming Stanway. He was purchased as a calf from C. B. Woolsey, of Aiken, South Carolina. In 1929 a polled bull, Beau Blanchard 62nd, was purchased from Iowa.

The present herd sire is Mossy Plato 26th. He and seven of his daughters were purchased in 1935 from Leslie Brannan, at Timken, Kansas.

### *Famous Sire*

Mossy Plato 26th is without doubt one of the most outstanding bulls of the breed. Last year Mr. Neil Trask, of Beaufort, South Carolina, traveled 6000 miles searching for the best Polled Hereford bull in the country. After looking them all over he finally purchased a son and two grandsons of Mossy Plato 26th. Mr. John M. Lewis, of Larned, Kansas, who is one of the oldest and one of the best breeders of Polled Hereford cattle, is using a sire which is a son of Mossey Plato 26th.

At the present time Clemson has 30 females, all sired by this great bull. The present plan is to increase the breeding herd to 100 breeding cows.

### *Breed Becoming Popular*

Polled Herefords are becoming a very popular breed of beef animal in South Carolina. The absence of horns, and consequent elimination of the task of dehorning, plus the absence of any danger of infection by screw worms is a big factor in their favor, according to many South Carolinians.

The beef cattle industry in South Carolina is steadily on the increase. The average farmer who once depended on cotton for an income is now seeking other sources of revenue. A point in favor of this statement is the fact that all of the bull calves sold by Clemson College this past year were sold to buyers within this State. This trend cannot be over-emphasized.

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First, let us send you a copy of a new 92-page book; it is full of interesting facts about good farming practice here in the South. Second, let our Service Division analyze your soil and give you a report on soil reaction, fertility and suggested cultural practice.

Through this and related services, we are endeavoring to do our part in the work of building an even sounder agriculture here in the South, by helping to widen the influence of the sound basic principles which have been established through the leadership of Agricultural College and Experiment Station authorities.

A postcard will bring a copy of the book and arrange for a soil test. There is of course no charge; we'd appreciate the opportunity to cooperate with you.

## The American Agricultural Chemical Co.

Charleston, S. C. — Columbia, S. C.



## GUEST EDITORIAL

(Continued from page 4)

the United States will remain agricultural. Nature has settled that. Climate and soil fit it for agriculture—more so than any other part of the country. The people must be fed and clothed and the South can do both.

However, the new problems in the South are keenly felt. There are problems not only of production but of distribution. Our problem is how to build and maintain a wholesome economic and social life. We must know the facts and use them as a guide to this solution. We must eschew the Utopias which are coming full-fledged from visionaries. The cultivation of the good earth in an antidote to such fancies. Close contact with the soil, both literally and figuratively, helps a man keep his feet on the earth. South Carolina is the land of opportunity but we must know how to use it.

## OUR SCHOOL OF AGRICULTURE

(Continued from page 5)

department maintains one of the most extensive variety plantings of peaches, apples, and grapes in the South. It is doing important work in the breeding of certain vegetable crops. Agricultural Engineering is one of the most rapidly growing departments in the school, teaching farm machinery, soil conservation, farm buildings, water and sanitation.

Associated with the work of the School of Agriculture is that of the extension service and the experiment stations. There is a county agent and home demonstration agent in every county and often two or more assistant agents making it possible to cover the state efficiently and contact most of the farmers getting to them the agricultural information developed by the experiment stations and other sources.

The Experiment Station itself consists of the main station at Clemson with five branch stations located in the various types of farming areas of the state. The research work of the experiment station has always been regarded as outstanding among Southern experiment stations.

Some of the men who have gone out from Clemson's School of Agriculture to distinguish themselves in agricultural pursuits include the directors of the Georgia, Alabama, and South Carolina experiment stations; the chief of the cotton division of the U. S. D. A., the regional conservator of the Soil Conservation Service for the Southeastern states, the director of the Southern division of the AAA, one regional director of the Farm Security Administration, the principal cotton technologist

of the U. S. D. A., the head of the rural social economics department at the University of Virginia, the chairman of the graduate committee for N. C. State College and many others.

In addition to the School of Agriculture Clemson has the Schools of Engineering, Textiles, Chemistry, Vocational Education and General Science. Each has its honor scholastic fraternity, as Alpha Zeta is in the School of Agriculture. Clemson's petition for a chapter of Phi Kappa Phi has just been accepted and this will set a higher goal for men in the honorary scholastic fraternities of the various schools to try to attain.

## THE PENDLETON FARMERS SOCIETY

(Continued from page 7)

While the society does not now meet regularly for the discussion of agricultural topics, it holds meetings two or three times during the year at which dinner is served by one of the ladies' clubs of Pendleton in the Society's hall. These dinners are sometimes held jointly with the Lion's Club of Pendleton and sometimes by the society alone. At the last one of these meetings, the society heard a discussion of farm management as illustrated on her own farm

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## CATALOG ISSUED IN MARCH

For a Copy Write

W. H. WASHINGTON, Dean,  
Clemson Summer School  
Clemson, S. C.



by one of the leading women farmers of the community.

From the foregoing paragraphs, one can clearly see that the Pendleton Farmer's Society has been in the past and is continuing at present to be one of the leading societies for the advancement of Agriculture in the South.

### SPIDERS

(Continued from page 8)

from all other spiders is the dark-red hour-glass on the under side of the abdomen. Because of this peculiar mark the name "hour-glass spider" is often applied to it. It is also known as the "shoe button spider" because of its globular, shining, black abdomen. Very rarely specimens are found without any red markings on them. Very uncommon are specimens bearing a pattern of white lines on the back of the abdomen.

The male is very much smaller than the female (one seventh to one sixth of an inch in length). On the lower side of the abdomen it has the red hour-glass design; on the top of the abdomen it has a series of red dots with white lines on each side of the red markings. The male bite is not poisonous to humans. Immature spiders of both sexes also show these markings.

The black widow is found in all sections of the United States, although it is essentially a Southern species. For a number of years the black widow are so scarce that they are rarely noticed. Then for a few years they abound in such large numbers that, due to some alarming publicity, they tend to raise widespread fear. Even in the years of black widow abundance when many farms contain several hundred spiders, authentic spider bite cases in the Southern states are still uncommon. The black widow therefore cannot be regarded as a very serious menace.

#### *Bite Rarely Fatal*

Spider bite cases are rarely fatal, and then under very unusual circumstances. The effects, although very painful, seldom lasts more than three days and in no recorded case has the bite resulted in lasting after effects. Like most spiders the black widow is very shy. If one chances to turn over a log or stone and disturb the spider, it will make every effort to escape and hide. Even handling black widows, gathering specimens by hand and holding them is not hazardous.

However the several hundred cases, apparently authentic, now on record prove that the black widow does bite on some occasions. Such cases as where the spider is hiding in a shoe and bites when the shoe is put on, or where the spider is caught in

a bed sheet and bites when the victim-to-be goes to bed, are easily explained. The spider is equipped with small fangs and will not use these fangs unless it is mashed or unless a person touches the spiders web with his hand or finger. If the spider is so disturbed it will not hesitate to bite with its very efficient poison fangs.

Death may, in some cases, result from black widow poisoning. Much will depend on the physical condition of the individual and where, on the body, the bite takes place. There are persons who are very sensitive to animal poisons. Some persons become very seriously ill following a bee sting or a wasp sting, and now and then one dies from one of these stings. Owing to the seriousness of the bite, it is highly advisable to consult a physician as soon as possible after being bitten. If the doctor is not available tincture of iodine may be applied to the wound; a sedative may well be tried, and a stimulant such as strychnine is desirable. Probably the most effective among simple remedies is hot baths. These should be given as hot as possible at frequent intervals.

From 1868 to 1888, South Carolina produced 90 per cent of the world's supply of phosphate rock.

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## PRODUCTION CONTROL AND TARIFF

(Continued from page 9)

country. The element of our population typified as the rural farm class embraces roughly one third of the total population. We have been hearing much lately about the poor destitute farmer, and have been inclined to think of him as an honest man not receiving all that he deserves. But in reality his position is far more astounding, for this one third of the population that he constitutes receives less than one tenth of the total national income. This disparity is even wider in the South.

It has been stated that no nation is richer than its land. This statement is very true and can be extended to mean that no nation prospers unless her farmers prosper, for the farmers are the backbone of any nation, since agriculture is the basic industry around which all others are built. Now, since the nation is directly or indirectly dependent upon the prosperity of the farmers, we see that the farmers are not alone affected, but the farmers, the industrialists, merchants, lawyers, and all others alike. Dr. Aull has placed agriculture as the nation's economic problem number one.

The above interesting facts, many of which were pointed out by Dr. Aull in support of the production control program, are mutually the problems of everyone who considers himself a citizen of the United States. Agriculture is the nation's problem, not merely the farmer's.

## RURAL YOUTH — TODAY AND TOMORROW

(Continued from page 12)

*Many Problems*

The farm boy in the past has had to do without many of the luxuries of life on account of general farm conditions. Today, the farmer is confronted with overproduction, underconsumption, high tariffs and low prices. Will our modern rural youth continue in the footsteps of our forefathers or will they cooperate with governmental agencies in control programs, so that agriculture may be established on a firmer basis? The writer believes that our youth will fall in line and conduct farming in a business-like manner. A more diversified type of farming will be established and eventually farm incomes will be increased, thereby holding our farm youth to the rural areas.

*Overpopulation*

Has the farm boy still an opportunity to make good on the farm? Let's look at our rural migration for just a moment. Annually, during the past decade there has been born on the farms approximately 700,000 babies and during the same span of time,

the death rate has been slightly over 300,000. By these figures we have an annual excess of practically 400,000. This is higher than the city rate. So it is necessary in order to balance our farm and urban population for some of these farm children to migrate from the farms. Another factor is the expectancy of life, which runs 5-7 years higher in rural areas than in urban areas. So by these figures we need not get alarmed about some of our rural population being lured to the cities, because we have a surplus already. We need more real farmers on the farms and fewer soil robbers and destroyers.

*Organizations for Rural Youth*

Some agricultural organizations which are doing a great deal for our rural youth are first, the 4-H clubs.

In 1914 a new day dawned in agriculture for the American farmer and formerly underprivileged farm youth, for in this year 4-H club work had its beginning. 4-H club work has many objectives and high ideals. Some of them are to help rural boys and girls, develop desirable ideals and standards in farming and homemaking; to afford technical instruction in farming and homemaking; to provide an opportunity for "learning to do by doing"; to instill in rural youths' minds an intelligent understand-

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ing, and an appreciation of nature and environmental influences; to teach and encourage thrift and cooperative movements; to use leisure time to an advantage; to produce products at a profit; and to appreciate the great out-of-doors.

Today, 4-H club work is making great headway, but there are approximately 12,000,000 farm boys and girls, and club work is only reaching around 1,000,000 annually. Since the work was begun 25 years ago around 7,000,000 have been reached. What will the figures be in the future? Judging the accomplishments of the future by the ones of the past and present—it would probably be safe to say that within the next decade more than twice the original number will be associated together annually as 4-H Club members.

#### *The Grange*

Another great organization which is helping to conserve our rural heritage is the Grange, America's oldest and largest farm organization and the only rural fraternity in the world. For nearly seventy years of vigorous life the Grange has endeavored to serve the farmer. The Grange was the first great youth movement in America and is still fighting for the conservation of our farm youth. The Grange conducts a five point program, namely: (1) Fraternal—It has the tie that binds and works behind closed doors. (2) Legislative—Every year the National Grange writes a legislative program and their main objective is to pass legislation to help elevate the position of the American farmer. (3) Educational—All meetings are educational as well as inspirational. (4) Cooperative—Cooperation is the selling point of the Grange; millions of dollars are saved annually for Grange members by buying seeds, fertilizer, insurance, etc., cooperatively. (5) Social—After the meeting is over the social hour follows. When one joins the Grange he is a member of an army of approximately 1,000,000 farm people striving at the same goal—*Agricultural Equality*. A few of the accomplishments of the Grange are listed here: Rural free delivery, parcel post, better roads, protection of pure food, stringent dairy laws, marketing facilities and cooperative buying. From Maine to California and from Minnesota to Texas, the Grange is conserving our rural heritage and fighting the farmers' battles. "Join the Grange, the gateway to agricultural opportunity."

F. F. A.

Another organization which is doing a great deal to help our rural youth is the Future Farmers of America under the direct supervision of vocational agricultural teachers. All "Future Farmers" are members of a national organization in which democratic control is exercised. Voting delegates

attend state and national conventions and receive valuable training as to parliamentary procedure and business methods.

Aside from the many advantages mentioned in the preceding paragraph, these Future Farmers have an opportunity to conduct livestock and crop projects, thereby learning the methods of modern-day farming and at the same time receiving handsome profits from the sales of their projects. Many boys become partners with their parents in this organization.

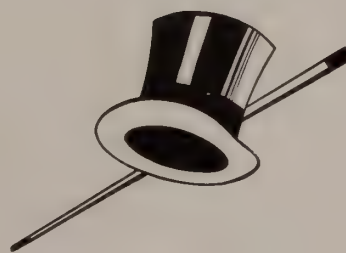
It is this writer's belief that our rural youth of today have a bright future if they will adhere to the principles outlined by the 4-H clubs, The Grange and the Future Farmers of America.

#### LIGHTING THE MILKY WAY

(Continued from page 14)

suffered no discomfort. Much body heat is lost through the window, and the investigation was necessarily conducted during the summer months only. The general treatment and behavior of the calves was the same as for normal individuals.

Since they undergo no suffering, the calves are happy to contribute to the health and well-being of other calves.



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## SOME TRENDS IN VOCATIONAL AGRICULTURAL EDUCATION

(Continued from page 15)

the basis of each year's program as well as for the long time program. This does not mean that the student can know less of the so-called fundamentals; but he must know more. There are *more* fundamentals today. The mathematics needed in solving mechanical problems on the farm is as fundamental as any. The electricity used in the operation of so many farm machines and home appliances is just as important, proportionally, as the power generated at the Keokuk Dam in Iowa to operate the street cars in St. Louis a few years ago. They are now even building electric fences and the rural electrification service is extending its activities, so that farmers must know something of electricity, even if it is largely for the protection of their bodies from electrical accidents. Vocational Agriculture cannot be stored in air-tight compartments of single sciences. It draws on many of them.

4. Another trend is *from the production goal to the economic goal and social goal*. A generation ago, we felt that to produce two bales of cotton per acre or one hundred bushels of corn or more per acre was in itself evidence of successfully solving the agricultural problems involved in these enterprises. We know now that production alone does not prepare a farmer to successfully cope with farming problems. Economic production was a second step, then marketing and distribution; and now farm boys and farmers are studying some of the more complicated problems of our social and economic order.

During the past few years much fun has been poked at the policy of "paying the farmer not to produce pigs", but poking fun does not solve the complicated problems that face the farmers and affect the nation. The place that cotton holds in national and world trade; the relationship of consumption to production; the increasing of the ability to consume; the efforts to put every occupational group on "parity" with every other occupational group for the benefit of the whole; the maintaining of sufficient individuality to stimulate and maintain initiative; and at the same time produce well-rounded citizens might be thought of as some of the unsolved problems in and related to agriculture. These problems call for educational and agricultural statesmanship.

Then, the place that the State (the Nation) holds in the program is of great concern to all. High school boys, farm youths, and adult farmers realize as never before what the government means to business. Doubtless, those who strove for protective

tariffs in other sections generations ago realized this; but we of the South kept our interest in individual initiative. We did not look to the government to protect a cotton farmer as the farm machinery builders of the North looked to the government to protect their business. It will probably take a long time to correct the great economic inequality that has developed. Unless farmers study this problem as carefully as industrialists, bankers, and others, we may not expect that action will be taken in our behalf.

### *The Future*

What is the future of Vocational Agriculture? One guess is as good, perhaps, as another. It might seem safe to predict that these problems will not become less but more complex and complicated every year and that the demand for legislation will become greater rather than less; that more schools and more communities will be calling upon the public school system to help the citizens of the communities to cope with these problems. This does not mean that less attention will be given to Agricultural Engineering, Agronomy, Animal Husbandry, Dairy, Entomology, and Horticulture, but *more*. This does not mean that less attention will be given to the mental development and the learning aptitudes of students, but *more*. This does not mean that less attention will be given to the educational program and to the coordination of vocational agriculture with all the other subjects of the school, but *more*.

In the field of education someone has estimated that its building and plants represent an investment of ten billion dollars, its annual expenditure two billion five hundred million, and the number of persons involved more than thirty million. The pay roll is larger than that of any industry. If all of this is to mean the most, its leadership must be aggressive and progressive.

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## GROWING GARDEN CROPS IN WATER

(Continued from page 16)

grown under the most favorable conditions, while in the field plants are subjected to varied conditions of soil and climate. This sort of comparison is entirely unsound. If a true comparison is to be made, all factors influencing plant growth, except the one under consideration, must be kept at the same magnitude.

*Water Yields Slightly Higher*

Plant physiologist at the University of California have tested the growing of plants in water along with plants in soil. In this test the plants grown in water and those grown in soil in a greenhouse were given the same spacing and cultural treatment. Results for one year indicate that the yield of fruit of plants grown in water will not be much greater than that of plants grown in soil. Data on the yield of tomatoes grown in soil in a commercial California greenhouse show that the yields were practically the same as the yields secured by the water culture method in another successful California commercial greenhouse. In other words, if plants grown in soil are subjected to the same conditions of light, temperature, water, air and nutrient supply as those grown by the water culture method, the yields will be practically the same. The growing of plants in water is essentially the same as the growing of plants in soil. The roots of plants grown in soil are bathed in solution just as are the roots of plants grown in water. We all know that the minerals necessary for plant growth must be in solution with water before they can be absorbed by plants.

*Put on Commercial Scale*

Soon after Dr. Gericke's results became known, the water culture method began to be tested on a commercial scale in other places. On Wake Island in the Pacific Ocean many garden crops are being produced successfully. These tank gardens produce enough vegetables to supply the staff of the Pan American Airways base situated there. In Montebello, California a certain firm is raising tomatoes in water culture in a greenhouse during the winter when prices are high. In Illinois a company has been growing roses, carnations, lilies, and sweet peas in water successfully for two years. A professor of dentistry at Northwestern University has made a hobby of growing plants without soil and is getting good results.

The usual equipment for the commercial grower consists of narrow shallow tanks made of wood, concrete, or iron coated with some cheap material which will hold water and which will not give off

poisonous substances. Coarse wire screen is placed on top of the tanks above the nutrient solution. On the screens is placed a layer of bedding material such as pine shaving or rice hulls. Some material such as sawdust or red wood shavings may give off certain poisonous substances and should not be used. Young plants are set in the bedding material with their roots reaching through the wire into the nutrient solution. The porous nature of the bedding material and the shallowness of the solution in the tanks makes it possible for the roots to obtain the necessary supplies of oxygen. The amateur gardener or small scale grower may use glass jars, earthenware, crocks, or glazed vessels instead of tanks.

*Various Formulae Used*

Various formulae have been developed to supply the necessary nutrients. The California Experiment Station offers two, a PN formula and a TC formula. The PN formula consists of potassium nitrate, potassium phosphate, calcium nitrate, and magnesium sulphate. In addition small amounts of iron tartrate, zinc sulphate, copper sulphate, manganese sulphate, and boric acid are necessary. Each chemical is applied in a definite quantity for any definite amount of solution. Other institutions have developed slightly

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different formulae. These fertilizer salts can be obtained from chemical supply companies or drug stores. There is no one formula that is suitable to all kinds of plants grown under all kinds of conditions. For example, there is a very close relation between the light supply, the nitrogen supply, and the type of growth a plant is making. With favorable temperature, the intensity and duration of light largely determines the rate of sugar manufacture within the plant, while the supply of available nitrogen determines the degree of vegetative growth. If the plant absorbs a large amount of nitrogen in relation to the amount of sugars being manufactured, then the plant will become extremely vegetative and non-fruitful. On the other hand, a lowering of the nitrogen supply, combined with the rapid manufacture of sugars will make the plant more fruitful and less vegetative. Since the light supply varies with the season, the rate of sugar manufacture will also vary, and the nitrogen supply must be varied in order to obtain maximum yields. The nitrogen supply should also be varied with the stage of growth of any particular plant. In general young plants developing their stems and leaves use more nitrogen than plants developing flowers and fruits.

Before extensive trials with growing plants in water are made, the water should be tested for the salt content and degree of acidity. Plants cannot grow satisfactorily in water which contains a large amount of salts or which is extremely acid or alkaline. In general, water that is suitable for drinking or irrigating will be suitable for the growing of plants.

#### CLEMSON'S BERKSHIRE HERD

(Continued from page 17)

is recognized in the herd at Clemson.

During the past few years the leading show herds of Berkshire hogs in this country carry considerable blood from the Clemson herd. As a matter of fact the stiffest competition which the College herd has had has come directly or indirectly from hogs which were sold by Clemson College. This is evidence of the tremendous influence which the Clemson herd has had on the improvement of the Berkshire breed.

#### THE FIVE ACRE COTTON CONTEST

(Continued from page 18)

known that climatic conditions, fertility of the soil, number of plants per acre, and insect and disease infestations are factors of even greater importance in the production of a high yield than the amount of fertilizer applied.

The following is a list of farmers who have won first prize in the ten South Carolina Five Acre Cotton Contest.

In 1936 another survey was made of the cotton mills to determine the effectiveness of the cotton contest in producing a longer staple cotton crop. The results were very satisfactory. It was found that 74.4% of the cotton consumed and reported was one inch or longer.

It has been clearly shown that the Five Acre Cotton Contest has done much for South Carolina in helping to solve the cotton problem. We feel greatly indebted to the Clemson College Extension Service and to the South Carolina Cotton Manufacturer's Association for putting the contest across in such a great way.

#### TREATING GREEN WOOD WITH COPPER SULPHATE

(Continued from page 18)

for such a method and as soon as one is found, the data will be arranged for publication.

The general conclusion is that wood preservation with a poisonous salt is possible on a simple, economical scale and soon a suitable method of treatment will be published which will bring the practice into use resulting in huge savings in labor, money and timber.

#### "SUPER-PERFECT MILK"

(Continued from page 19)

##### *Cadets Like It*

The fat content of the college milk is always above four per cent, and its nutritive value is enhanced by the scientific care and feeding of the cattle. As for its flavor, no comment is needed, as far as those who drink it are concerned. Seldom does a day pass when cadets in the mess hall are not seen foraging (usually in vain) for partly-filled milk pitchers left by other diners.

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## BEAUTIFYING OUR HIGHWAYS

(Continued from page 20)

work. Later it is hoped that this work will be continued on other roads.

Highway beautification in South Carolina has been under way for four and one-half years. These projects are among the best in the South. There are several under construction at the present time. The oldest one is a four-mile stretch of highway between Pendleton and Clemson. For a general view of part of this four-mile stretch see Figure 1. The shoulders of this section, as well as those of other projects in the state, are covered with a thick mat of rye grass sod. Ditches are graded and sodded to form valley ditches.

*Increase Land Value*

Beautification increases the value of the land alongside the highway. Land along the Pendleton project sold for as low as thirty-five to forty dollars per acre for building purposes. Since finishing the work some desirable one-half acre building lots are now sold for from three hundred to seven hundred dollars depending upon the location. Similar rises in building lot prices have occurred along all beautification projects in the state.

The four-lane highway projects which have been completed recently in South Carolina include two three-mile sections. One runs north of Charleston, the other out of Columbia toward the Veteran's Hospital. There are two six-mile sections with a twenty-foot grass plot between the two two-lane roads. One is out of Spartanburg toward Greenville, the other is out of Greenville toward Spartanburg. There is a four-mile, two-lane section of improved highway from Greenville toward Traveler's Rest. Contracts have been let to complete the super highway between Greenville and Spartanburg, a total distance of thirty miles. This will be one of the finest stretches of road in the entire country, according to highway engineers working on the project. There will be valley ditches on each side and a twenty-foot grass plot between the opposing traffic lanes. Another contract has been let to improve fifteen more miles of the four-lane highway out of Charleston. All of these projects are planted in such a way as to simulate natural growth. Any local, native trees that are in suitable positions are left in place. Figure 2 shows a grove of trees near Charleston. Spanish moss is characteristic of this area.

Plants that are usually used in these projects include honeysuckle on banks and steeper slopes. Narrow-leaved water oak, white oak and elm are used on high sections. Along streams and in low

places, birch, beech, sycamore, red or swamp maple, and yellow poplar or tulip trees are planted. Evergreens that are used include American holly, spruce, slash pine, and red cedar. Flowering plants include dogwood, black hawthorn, and mimosa.

## MODERN COTTON PICKING

(Continued from page 21)

attempts to make a mechanical harvester failed. Early machines with spiked drums, not only injured the plants by their raking motion, but also failed to

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gather and retain the small amount of cotton which was clawed out. Machines having rotary brushes, as well as those which dragged chains bearing hooks through the plants, were failures. Pneumatic pickers were not successful because of the excessive power required for their operation, and also because they required manually controlled suction tubes which proved to be too slow. Of course, as cotton has a high affinity for nearly everything with which it comes in contact, it is not logical or reasonable to expect any mechanical device to pick the cotton entirely free from foreign matter.

#### *New Rust Machine*

At present, there are several new cotton picking machines practically ready for the market. Nation-wide comment has been inspired by a new cotton picker developed, after several years of experimentation, by John D. and Mack Rust of Memphis, Tennessee. Of simple and clean design, this machine employs as its working principle the affinity of cotton fibres for wet surfaces; therefore, it has no hooks or teeth on its collecting spindles. As the inventor says of his machine, "it consists primarily of an endless belt carrying several hundred smooth wire spindles. As it passes over the row of cotton, the rotating wire spindles enter the plants. The speed of travel of the carrier (and the consequent movement of the spindles in a backward direction during contact with the plants) is approximately equal to the speed of the forward travel of the machine. The spindles, therefore, while in the plants, rotate in a position approximately stationary with relation to the stalks. This avoids endangering the plants."

The spindles of the Rust machine are automatically moistened before they enter the plants. Cotton fibers adhere, are wrapped about the spindles as they rotate, and in another part of the machine are stripped of the spindles and delivered by a suction fan to a container. It is claimed that the spindles probe every part of the plant, that only mature cotton is gathered while immature and faulty cotton is left behind.

#### *Will Lower Production Cost*

Although the harvesters now are showing fairly satisfactory performances under reasonable good conditions, necessary refinements must be made. Cotton picking is and always has been, the costliest operation of cotton growers, and much thought has been given to the job of lowering that cost. Too much remains to be done in solving the picking problem for anyone to say that present mechanical pickers will cause a social upheaval or an economic revolution in the South. Though it may be assumed

that the demand for mechanical cotton harvesters will be stimulated by the increasing scarcity of hand pickers, there is no probability of their being produced in quantities sufficient to revolutionize agriculture, or to seriously affect the labor situation in cotton-growing areas.

#### CAMP LONG

(Continued from page 23)

moreover, 250 passed the beginners test, 92 the swimmers test, 11 the junior life saving test, and 5 the senior life saving course.

In addition to this training in recreation, many courses of technical value are offered, including hygienics, crafts, entomology, forestry and soils. The camp offers cultural and spiritual benefits and helps the boys and girls to develop such qualities as resourcefulness, helpfulness, neatness, courtesy, and a democratic spirit.

Mr. Shelton in an official report, following a weeks stay at the camp, during the Rural Life Conference last August, stated, "Camp Long is really a model camp." This will certainly be the opinion



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of anyone who visits the camp, for its ideal location, recreational and educational opportunities make it an unexcelled summer retreat for the rural boys and girls of South Carolina.

#### WORLD FAMOUS BULL AT SAND HILL STATION

(Continued from page 24)

Laddie, had seventy-three Advanced Registry daughters, three having records of 800 pounds of butterfat or better, and eleven ranging from 700 to 797 pounds. Dorothy's dam was Imported Wye-brook Rose with a record of 710 pounds of butterfat in class BB, a class leader record when made.

#### *Sire Was Great*

"Sequel's sire was Langwater Holliston of Rockingham, with twenty-two Advanced Registry daughters, including two with approximately 750 pounds of butterfat each. His paternal grandsire, Langwater Holliston, sired the famous cow, Langwater Levity, whose sale price was \$15,000, and who was former world's champion in class EE. The dam of Langwater Holliston was Imported Belle of Rockingham with a record of 622.2 pounds of butterfat, former New Hampshire champion in class AA. She also had five Advanced Registry daughters, all with remarkable records.

"Sequel's" sale price was \$1250, paid to H. H. Buckley, former owner of Cathedral Farms, Oneonta, N. Y. On the day following the transaction, an offer of \$2500 was made for him, followed (according to an unconfirmed rumor) within a week by another offer, of \$5000.

#### FROM THE DEANS

(Continued from page 26)

#### *Dean Cooper*

arrange the details of publication, distribution, etc.

Those students who write for the journal and those who are responsible for the subject matter of each issue and for editing the material submitted will necessarily broaden their fields of knowledge and thus profit from their connection with the enterprise.

The publication should be of much interest and value to its readers. It will keep them informed not only of the activities of agricultural students and organizations at Clemson but will no doubt also bring interesting news of the latest developments in agricultural science and practice, both in South Carolina and elsewhere.

The experiment station and the extension service will cooperate in furnishing much live agricultural news for this state.

The agricultural graduates who have gone out

from Clemson during its almost half a century of service have established a tradition of success which has been a subject for unsolicited comment by many who are not Clemson men. Recently Dr. E. C. Auchter, Chief of the Bureau of Plant Industry, United States Department of Agriculture, told a group here that he had been greatly impressed with the large number of Clemson men in important agricultural positions throughout the country. Our students who go to other institutions to pursue graduate studies not only make excellent records in their work but, equally important, get along unusually well with those whom they come in contact.

The editors will keep in mind this reputation possessed by those who have trod the agricultural highway ahead of them and will issue a publication which will be not only a credit to themselves but in complete keeping with our fine agricultural traditions.

#### *Dean Washington*

and Agricultural Education which will help them in rendering a worth-while service back to the society that has made possible their educational opportunities. We believe that, in turn, these students will be setting examples which will stimulate other students in other fields to broaden their vision and deepen their educational experience in college.

Again our best wishes go to the staff in its efforts to render this service.

#### THE CLEMSON POULTRY PLANT

(Continued from page 28)

and peanut meal in the ration.

The experiments are designed to apply directly to South Carolina conditions. Range paralysis is one of the scourges of some South Carolina flocks. Cottonseed meal is one of the cheapest sources of protein available in the state. Oats and soybeans can be grown cheaply on the farm. The poultry department is showing the farmer how to produce poultry and eggs economically and thereby increase the farm income.

#### HORSE SHOWS IN OCONEE AND PICKENS COUNTIES

(Continued from page 28)

The judges in the Oconee County Show were: L. V. Starkey, Clemson College, W. J. Sheely, Extension Animal Husbandman, Florida, T. A. Bowen, County Agent, Pickens. The Pickens County judges were: L. V. Starkey, Clemson College and G. H. Griffin, County Agent, Oconee County.

#### *Sponsored by Clemson Men*

Both of these shows were sponsored by County



Agents and Smith-Hughes teachers who got their training from Clemson. Both shows were attended by several of the Clemson cadets who are majoring in Animal Husbandry. The people who attended these shows seemed to enjoy them very much and they are looking forward to more and larger horse shows.

Is there money to be made in the production of such livestock? Be your own judge. This is not official, but the writer personally saw one of these farmers sell a three months old mule colt for \$75.00. Why don't you accept this challenge, Mr. Farmer? Turn your depleted lands into suitable pasturage by planting Bermuda and Dallis grasses thereon. Besides pasturage there are innumerable feeds which you can produce at home at a low cost.

Agriculture, the basic industry, is also the oldest industry. Man probably began cultivating crops, as shown by archeological research, as early as 10,000 B. C.

The oldest farmer's society hall in the United States is in Pendleton, South Carolina. The Pendleton Farmer's Society was organized in 1815.

### *Notice to Advertisers*

When we were soliciting advertisements this publication was called "The Clemson Agricultural Journal." This name was very similar to other student agricultural publications so we thought it would be better to change the name. After much thought, we decided upon *The Agrarian* as the name for the official student publication of Clemson Agricultural College. This is the only change in the magazine. It still has the same number of pages, the same size, and circulation. We sincerely hope that this small change will not confuse our advertisers.

THE EDITORS

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# *The* **Agrarian**

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



THE CULTIVATOR

MARCH  
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# The Agrarian

OFFICIAL STUDENT PUBLICATION

VOL. I



No. 2

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# Venerable Leaders of the South

By R. L. ARIAL, '40

AT Clemson Agricultural College there stands a large, white columned mansion, a truly impressive structure, commanding a central position on a beautiful and well kept campus. "What wonderful old home is that?" an admiring visitor might ask. "That", would reply an enthusiastic cadet, "was the home of John C. Calhoun and later of Thomas G. Clemson, the founder of our college." Yes, Fort Hill is a beautiful old home, and it stands today as a shrine to two great men, Calhoun and Clemson.

John C. Calhoun, who built Fort Hill, was an eminent figure in our national history. He is probably the most well known statesman that South Carolina has ever produced, having held the positions of Senator, Secretary of War, Secretary of State, and Vice-President of the United States. Being an ardent nationalist, the word "nation" was often on his lips, and his sincere aim was to promote national unity which he described as necessary for national power. He won the respect of everyone who knew him, and was known as "the most elegant speaker in the House . . . ." Because of his great services during the War of 1812, A. J. Dallas describes him

as "the young Hercules who carried the war on his shoulders."

The popular opinion that Calhoun was a strong sectionalist, devoting most of his time to the needs of the South, is of course not wholly true. During the latter part of his life, however, he contributed more and more of his ingenuity to the particular problems of the South, and became greatly concerned with her future. His last words in public, before his death in 1850, were, "The South, the poor South; what is to become of her now?"

The hopes of Calhoun for the South can be identified with the hope of Thomas G. Clemson, his son-in-law and heir,—for the founding of "an institution for the diffusion of scientific knowledge that we may once more become a happy and prosperous people." Clemson was a scientific farmer and believed that the future of the South depended on scientific education. He saw the ill effects of the one crop system that throughout his life had been robbing the soil of its richness, and the effect of soil erosion which was robbing the people of their basic heritage. In support of his belief in chemical

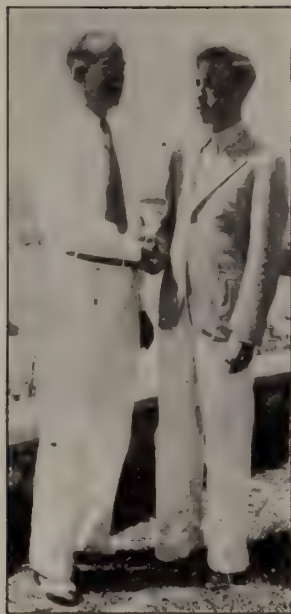
(Continued on page 40)



# THE DARE TO DO

By L. M. RHODES, '39

THIS is an appeal to agricultural underclassmen with the hope that a more earnest effort and a new seriousness of purpose may be added to those traits which characterize each of you.



The Writer  
with Mr. Danforth

Many of you have heard about the Danforth Fellowship, but have given little consideration to it as one example of the many rewards of those who endeavor, the ambitious reap. Among the few in each class who have opened their minds to wise thought about this four weeks of real life will be found the winners. They will receive a share of glory, but to all who aim high will come a fine sense of achievement in a race well run. Wake up! "Do something and be somebody!"

Thirty-eight agricultural colleges from Maine to Washington and from Canada to Louisiana are represented. The Danforth Fellowship is awarded to thirty-nine (Texas A. and M. is allotted two) ranking agricultural juniors at the end of each year by William H. Danforth, Chairman of the Board of Ralston-Purina Mills, in conjunction with this organization. In addition to the senior award there is given to the outstanding agricultural freshman at each of the institutions included a half scholarship for the two weeks at the National Youth Foundation Camp. Benefits of this camp are not everybody's right or privilege even for money. Each summer waiting lists of paying applicants must stand back for tomorrow's leaders, selected carefully throughout the land.

Last summer we privileged thirty-nine assembled in St. Louis at the Y. M. C. A. Hotel on Friday, Saturday, and Sunday preceding August first. By the time activities were started on Monday morning nearly all of us were acquainted, so easily were these names and faces remembered. At the offices of Ralston-Purina we were welcomed warmly and oriented quickly about the details of the program that was to follow.

From St. Louis we traveled forty miles to the Purina Experimental Farm, where we spent four days. The farm is an extensive testing ground for feeds and feeding programs for livestock and poultry. The boys were divided into small groups which worked with animal units of their choosing most of the time. These units included beef, dairy, poultry, swine, and dog, fox, and rabbit divisions. Then we were switched for brief periods to the other units. One of the dogs at the farm is a South Pole husky given to the farm by Admiral Byrd.

Milking the cows before daylight and feeding the animals never will be forgotten, but the foremost thought connected with the farm ever will be of Mrs. Whitsell and those bountiful meals. Three times a day while at the farm the ravenous thirty-nine gathered at the dining table of the farm's genial housekeeper.

After supper each night, we played softball games; the East versus the West or the North versus the South. We not only witnessed intersectional athletic contests, but we were in them!

Returning to St. Louis, we attended classes in the big, comfortable, air-conditioned office building that is the home of Ralston-Purina. From eight in the morning until five in the afternoon our schedule was made up of classes and laboratory, office, and mill tours. Experts in feeds, sanitation, research management, biology, veterinary medicine, personnel, business law, manufacturing, finance, and merchandising had their turns at being hobby-horses on our informative mental merry-go-round.

On Saturday of the first week the group visited the St. Louis Grain Exchange where we gleaned useful financial information. After this, we took a city-wide sight-seeing tour under the auspices of the Chamber of Commerce. The following Monday we spent at the St. Louis Stockyards.

After the second week of classes, we left by special bus for Chicago, where we spent Saturday night and Sunday. Sunday was sight-seeing day again. The attractions were the Field Museum of Natural History, the Shedd Aquarium, the Adler Planetarium, and the Rosenwald Museum of Science and Industry.

Scene Two found us at Camp Miniwanca at Shelby, Michigan where two weeks' association with men studying our leadership qualities were in store. Here we were treated to action—capitalized



and underscored! Daily routine included reveille at six o'clock, setting up exercises, a dip in Lake Michigan's untempered waters, tent cleaning, a ten minute period of pin-drop quite for controlled thought and reflection, breakfast, classes (starting at eight o'clock), assembly, then dinner at noon, and a final class at one o'clock. Tribal games, swimming, one hour's rest, supper, vesper services on Vesper Dune in the sunset, and a council fire program completed the stimulating program of the day. Tribal organization of the more than three hundred boys present facilitated routine and provided for competition in inspection, athletics, and keeping good note-books. Point scores were kept and the winning and "cow's-tail" tribes suitably honored.

Our inspiring classes were entirely free of cuts and the "have-to" feeling. Ethics and attitudes, techniques and leadership, thinking through a life philosophy, and life's essentials were taught to us by a most distinguished faculty. It included Mr. Danforth, and other leaders from whom everybody wished to carry away many basic social and spiritual qualities.

Balance was the keynote at the camp. A questionnaire filled out by the camper provided the camp's psychologists with data relative to physical, mental, social and religious qualities. From these a graphical picture of the camper was developed. The "personality physicians" examined the picture, made a diagnosis, and gave a scientific prescription of the paths to achievement and equilibrium. Then Mr. Danforth said (and says) to all, "I dare you!"

Does it sound attractive? If it does, be assured that words are a poor excuse for and an ineffective stab at description. "I cannot tell you—you must see for yourself."

Will it be you?

## RADIO BROADCASTS

The Clemson College Extension Service conducts regular radio broadcasts each week for the purpose of acquainting farm men and women with general information concerning agricultural activities in the state which will enable them to keep abreast of the more modern practices of agriculture. Below is a schedule of the Extension Service's broadcasts:

Station WBT, Charlotte, N. C. Tuesday, Thursday,  
Saturday 12:00 M.  
Station WAIM, Anderson, S. C. Monday 12:15 P.M.  
Station WIS, Columbia, S. C. Tuesday 11:15 A.M.  
Station WIS, Columbia, S. C. Thursday 11:30 A.M.  
Station WOLS, Florence, S. C. Tuesday 12:30 P.M.

## Power Machinery in the South

By R. L. HEARON, '40

THE agricultural machinery companies have made gigantic strides since the first cumbersome tractors were sold in 1907. That event marked the beginning of a new era in farming methods,—an era which has seen the invention of countless labor saving devices which the wise farmer has made good use of,—an era which has not reached its peak.

The South, which contains over one half of the farmers of this nation, uses less than one fifth of the farm machinery in the United States. Probably the main reasons for these conditions prevailing in the South is the abundance of cheap labor and the comparatively small size of our fields.

Today, however, the farmers cannot depend on this labor as much as they formerly did. Farm machinery companies realize the situation which faces the South, and so they are designing farm implements for the fields and the needs of the southern farmers. Every farm machinery company realizes that the South is a vast potential market, and that to sell to the South they must produce machinery needed by Southerners. No longer can we in the South complain of the high cost of farm implements, or that it would be a waste of power to use tractors in our small fields. The farm machinery companies have designed machinery for us, and the far sighted, progressive farmer is using these machines.

Not only are tractors being designed to deliver power in the field, but there is an increasing tendency to design tractors that may be used for fairly high speed transportation of farm products. Manufacturers are also thinking of the comfort of the operator. Foremost among the ultra-modern tractor is a four wheeled machine which is equipped with a cab, front bumper, and headlights. A heater and a radio are easily installed. This tractor, fittingly called a Comfortactor, has a top speed of forty miles per hour, thus making it practicable for the transportation of farm produce.

One tractor company is producing a tractor powered by a six cylinder high compression engine equipped with a self starter. One model of this machine handles two plows in almost any soil, and sells for only \$727 F. O. B. factory.

Two other companies have designed tractors admirably suited for small farms. One of these companies has on the market a four cylinder tractor which handles loads ordinarily handled by two horses. It is a fine tractor for small fields, for it has a turning radius of only seven feet, a wheel

(Continued on page 35)



# Aiken, the Sports-Center of the South

By H. A. JOHNSON, '40

IN the field of sports, Aiken has justly won the title, "Sports-Center of the South." It has fifteen polo fields, miles of bridle paths and drag hunt lines, a new mile track, a flat racing track, a steeplechase, two eighteen hole golf courses, indoor and outdoor tennis courts, horse shows, polo pony shows, golf tournaments, tennis matches, field trials, kennel shows; also various contests and other forms of entertainment throughout the winter season.

Aiken was founded in April of 1835, after the Charleston and Hamburg Railroad, which now runs through the town was laid. The town was named for Governor William Aiken, one of the founders and first president of the Charleston and Hamburg Railroad.

Aiken is situated on a high ridge of land between the headwaters of the Edisto river and the streams which empty into the Savannah. It has long been noted for its elevation, being located where the combination of abundant pine growth and the invigorating air of a mountainous country may be enjoyed.

Early in the history of Aiken, travelers hearing of the healthful climate came to the town to rest and recuperate from minor ailments. Soon schools and academies were started and the young children were tutored by ardent sports lovers. Mrs. Louise Eustis Hitchcock taught her boys the game of polo. Because of her tutoring the world now knows her son, Thomas Hitchcock, the international player, a resident of Aiken.

Mr. William Post early came to Aiken and started a polo pony training headquarters. His pony ranch is now one of the largest and best known ranches in the country. Steeplechasing is well established in Aiken. This sport center has been the training ground for some of the nation's most famous mounts for over fifty years. F. S. von Stade,

F. A. Clark, G. A. Bostwick, John Schiff and others who were instrumental in establishing steeplechasing in this country are frequent visitors to Aiken.

The Hunt



One of Aiken's Many Beautiful Forest Lanes

Everyone in Aiken is interested in horses. With many who like speed and excitement, the drag hunt is the favorite of the horse sports. To visitors, the Aiken drag, with its fast pack and thoroughbred hunters is more like a steeplechase. These hunts are held thrice weekly during the winter season.

Aiken enjoys a moderate climate, with enough snappy days to act as a tonic to man and horse alike but with plenty of warmth and sunshine to limber up muscles and burn up the inner layers of fat which must be eliminated before a horse is fit and ready for the races. Other than the trotting held on the mile track, there is the Imperial Cup Race held annually to stimulate interest and to attract fine horses from other places. The winner of this race holds the Imperial

Cup in his possession for one year. A thousand dollar purse is added to this race.

Golf is important to Aiken Colonists and Natives alike. The Women's Invitation Tournament is an affair which is always looked forward to with interest. The youngsters love their dogs and shooting. Kennel shows and trials are held often. A few of the World's Grand Champion dogs have been bred and raised here. Aiken has several dove and quail shoots. The children soon become expert rifle shots in this sport.

Aiken has a native population of around 7,000. In the large winter colony are over a hundred beautiful estates, owned by leading sportsmen of America. In addition, approximately a hundred locally owned homes are rented to the winter visitors each season, thus making Aiken the largest winter colony of sports loving tourists to be found in any southern resort.





D. W. WATKINS  
Director of  
Extension



#### GUEST EDITORIAL

HOW many people there are who think of farming as a firmly established, stable and unchangeable business! But agriculture is the most changeable of businesses. Perhaps you know of a farm family which has stayed on the same land through three or four generations. We feel great satisfaction in hearing of such families. Let us remember, however, that the family is able to stay on the land not because of the stability of farming but in spite of various and unceasing changes that confront farming as a business. The stable family stays with the land because of ability, whether inborn or acquired, to meet change successfully. No doubt the capacity to meet change is in most cases acquired just as the human species acquires the ability to swim, ride horseback, or stand on one's head. Here is reason enough for the existence of state agricultural colleges. For a large per cent of farm people to be able to adjust themselves to new conditions is important, very important, to the general welfare. Nowhere is the development of this ability on the part of farm people more important than in South Carolina because the facts of history show that since the white man came to America it has been the destiny of this region to be confronted with changes more profound in degree and in scope than any other part of the country.

Changes must be met by farmers as individuals and by agriculture as an industry. As an individual a farmer must constantly adjust his plan as to what to grow and how much of each crop, what seed and fertilizer to use, what risks to avoid or take in production, and marketing, how best to save and treat his soil for best production, what livestock to produce, what balance to adopt between livestock and crops, and so on.

# Agricultural Change and Farm Development

*By D. W. WATKINS, Director of Extension*

These and similar problems continually spell success or failure to all farmers as the right answer varies with changing conditions. Such problems largely caused the establishment of our agricultural colleges, experiment stations, county agent systems, the U. S. Department of Agriculture, and the agricultural teaching in high schools.

Practical service, and education enables farmers to meet the great changes taking place in the business of farming with the fewest possible such changes being forced on people through the hard process of mortgage foreclosure.

The lifetime of the present crop of college seniors has spanned some of the most profound changes that have occurred in South Carolina agriculture and the end is not in sight by any means. We are now in a transition period of profound adjustment. Changes in agriculture naturally come slowly because they are usually painful. If greater profit beckons farmers on, well and good, but it is so often the failure of profit that forces the farmer to go pioneering into some other type of farming.

In 1921 South Carolina experienced the onslaught of two major disasters at the same time. First, there was the great deflation, unduly harsh on debtors in the speed of its application; and second, there was the cotton boll weevil, involving adjustments and shifts in agriculture not yet fully accomplished. No other region had to meet these two disasters at the same moment. Thousands of farm people were bankrupted with no more blame than attaches to a man whose home is destroyed by a tornado—and most others had their equities impaired more or less seriously. Following fast after 1921 with a change in the federal government there was imposed in 1922 the highest tariffs ever thought of up to that time. It was a shift from a world war with guns to a world war of economics and trade. "Horse trading" is not regarded as a particularly high type of business but it is a calling of honor compared to the type of world trade that became current after 1922. In fact we have, since Secretary Cordell Hull has been promoting reciprocal trade,



been trying to return to a type of international trade based on a consideration of ethics. In a trade war this country has some advantages because it has more money. It maintained its foreign trade after 1922 by the simple process of loaning its money abroad with which foreigners bought our products. The average citizen knows little about the intricacies of foreign trade and worries less. So long as foreign countries continued to take our cotton and tobacco we only growled about the price and let any who cared bother about the ugly pattern of world trade which was fast developing. Farm people continued thus throughout the '20's lulled into a sort of twilight sleep by the continued loans abroad that kept our farm products moving, though at unsatisfactory prices.

This particular brood of chickens came home to roost in 1929 when it became evident that we were not really loaning our money abroad, but giving it away. So we quit that kind of trading and foreigners quit taking our goods. Cotton growers felt the effect first, followed by producers of all crops that depend upon export markets. Farmers not only couldn't buy the products of our industries but they were unable to pay their debts. There are 30 million farm people in this country. With this many people removed from the market, the wheels of business and industry stopped turning and industrial workers who had hoped to maintain wages at war-time levels were turned into the streets from whence they drifted back to the farms. Farm production was maintained as though no profound change had occurred. The Federal Farm Board was launched to carry the farmers' surplus problem but the weight of the cargo promptly sank that ship. In the meantime industry in 1932 once more sought to save itself in the face of lost farm buying by boosting tariffs to yet higher levels.

Then came the New Deal, born largely of the belated realization of common interests between the farming west and the farming south. Great new agencies have been established with more federal appropriations for one year than have been devoted to teaching agriculture in the state agricultural colleges and to extension work in all the time since they began. Through these activities we have tried to re-establish our soil fertility, rehabilitate bankrupted farm people, perfect a sound farm credit system, balance farm production, electrify farm homes, and take at least the first steps to make farm life what the Creator intended—something that would attract the industrious and ambitious citizenry, with reasonable hope of reward.

This objective should be kept in mind. But surely farm people cannot overlook the basic condition to its attainment which is that they must be

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ready and able to meet changing conditions in the world of affairs. Let business and industry never again imagine a prosperity which leaves agriculture out. Nor must agriculture continue to be exposed to uncontrolled exploitation by the wolves of commerce and industry, whether great or small. Farm people must forget any inclination toward a feeling of inferiority which may have been engendered by our man-made economic pattern, and set to work to redesign that pattern. With feet grounded firmly in the realities of our economic and social life and in the friendliest, most cooperative spirit, farm people might well say to the people of America: "Here stands Agriculture. Exploit us at your peril. Cooperate with us and together we shall long continue secure in the land."

For 100 years this country was a government of, by, and for business interests. Then organized labor began to take part. At last agriculture has begun to participate and from now on it will have to have material consideration along with other interests. The agricultural colleges must lead the way.



# THE HOLLERITH TABULATOR

## THE MACHINE THAT "THINKS"

By R. L. ARIAL, '40

SINCE the dawn of civilization, when our primitive forefathers first discovered the bow and arrow as a means for securing food, man has reached great heights on the ladder of civilization. There exists a definite positive correlation between this advance of civilization and mechanical development; moreover, the farther civilization advances the more dependent it is upon the machine. Our progress, therefore, cannot be dissociated from the development of the machine.

Contemporary writers and analysts have had much to say as to whether man still uses his devices to obtain desired results or whether the results as a whole are undesirable as a result of the mastery of the machine over man. They have questioned the assumption that civilization has advanced. Obviously the crux of the problem lies in the desirability of the results of the man-machine combination.

Wage earners have been ousted from their positions by labor-saving machines and have been unable to find other places. Some observers naturally conclude that machines are anti-social and should be abolished. Possibly this solution is advanced because it is easy.

Without any rehashing of the enigma, we leave it with you. Our purpose here is to present to you the Hollerith Tabulating Machine, about which you may draw your own conclusions. Says Professor B. O. Williams, Professor of Rural Sociology and Statistics, "Without this machine many of the studies we are now making, could not be made."

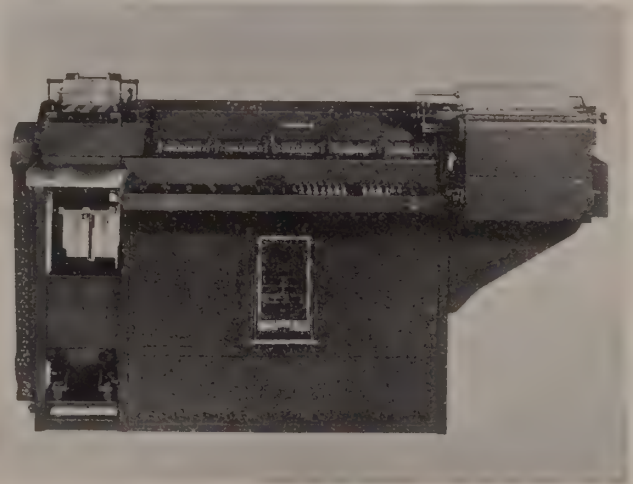
Statistics involves collection, analysis, and interpretation of numerical facts. Dealing with large amounts of data and dividing it into classes and subclasses is at least very time-consuming. It is here that the Hollerith Tabulating Machine is used to inestimable advantage. It may be referred to as our servant.

Let's take a trip to the basement of the Library building and watch our servant, Jeeves. We find here that, say, a study of Clemson students is being made. Someone wants to know the number in each class which belongs to churches, to what churches, the number that attend vesper services, and so on.

Jeeves refuses to do certain classes of labor, such as transferring our facts to the cards with which he works. This is left to an accessory machine.

Since Jeeves has turned up his nose at the menial task of putting down the facts, we turn to Jarvis, the key punch machine. Jarvis uses a uni-

form set of cards divided into columns of numbers. According to a predetermined code he punches each card in certain places as the facts are being fed to him by the person making the study. His



The Human Machine

performance amounts to "photographing" each student's religious affiliation and activity. If several students are similar, "prints" of these "photographs" are a matter of seconds.

Now that everybody's picture is taken, we take the unassorted pile over to Jeeves. Jeeves is a wizard. He looks at the big pile, gobbles it up, and in a few minutes he has separated all the sinners and angels into as many classifications as wanted. We don't know how he did it, but for every minute he was working, Jeeves got a good look at 400 of those pictures.

Now Jeeves turns the completion of the task over to Jeems, his second assistant. Jeems looks at the features on each picture and counts the number of each. In short, he counts and totals the items. Then he prints them on analysis sheets. Jeems requires a bit more time for this more complicated job. His best speed is a mere eighty cards a minute.

Assuming (for instance) our research had involved 20,000 families, we would have been able to complete the job in a few days, whereas such a study would have taken months had we used hand-sorting methods. What is more important, we have added to the sum total of man's knowledge.

Summarizing, we have recorded and assorted data, counted and totaled them, and printed the information on analysis sheets. Now we ask you, are such machines properly referred to as servants or masters?





## An Interesting Landmark

By R. A. SMITH, '41

Located about 30 miles west of Clemson College is Knox's Bridge, one of the few covered bridges left in this section and one of the longest, oldest, and most widely used bridges of this type in the United States. It is now nearing its hundredth birthday and never has been out of service for even a day. Although this bridge does not blend with the progress being made by people who live nearby, it represents the sturdy character and patience of our forefathers. Probably the first type of vehicle to cross this bridge was a cart drawn by oxen; then came mules, horses, other types of animals, and so on until today it is bearing the burden of the modern ten-ton trucks.

This historical structure was built by Samuel Knox in October of 1854, at a cost of \$10,000 and two years labor. Originally it was a toll bridge bringing the owner from \$2,500 to \$3,000 a year. Fifty cents was charged for a team of horses; twenty-five cents for one horse, and five cents for a man afoot. It has been toll-free since 1908, when it was sold to Oconee and Hart Counties. Yankees used this bridge very extensively during the Civil War.

Knox's bridge is 300 feet long, 12 feet wide, 12 feet high, and rests upon pillars 35 feet above low water. It took six months to make the wooden pegs which were used to hold all the parts together. In other words the bridge was practically "handmade". Recently, however, it has been reinforced by steel rods. Water has reached as high as ten feet inside the bridge and has many times washed planks off of the side, but it remains as it was a century ago except for the addition of new pillars and repairs of the roof. It is estimated by Mr. Knox's grandchild that it is good for another century.

## Man Works for Mule

"Over the hill trailed a man behind a mule drawing a Dixie plow. The clodhopper was "broadcasting". " Bill, you are a mule, the son of a jack-ass, and I am a man made in the image of God. Yet, here we work hitched together, year in and year out. I often wonder if you work for me or I work for you. Sometimes I think this is a partnership between a mule and a fool. For surely I work harder than you do. Plowing here, we cover the same distance, but you do it on four legs and I on two. So, mathematically speaking, I do twice as much work per leg as you do.

"Soon we'll be preparing for a corn crop. When the corn is harvested I give one-third to the landlord for being kind enough to let me use this corner of God's universe. Another goes to you, and what is left after the weevils and mice have had their share goes to me. But while you consume all of yours except a few cobs, I divide mine among seven children, six hens, two ducks, and the bank. Bill, darn you, you are getting the best of me: it ain't fair for a mule, the son of a jackass to rob a man, the Lord of creation, of his substance. And come to think of it, you only help to cultivate the ground. While me and the family is hard at work pulling fodder for you on a hot August day, you are over there in the pasture giving us the he-haw.

"All fall and part of the winter, the whole family, from granny on down to the baby, pick cotton to help raise money to buy your harness and pay interest on the mortgage on you, and anyway, what do you care about mortgages. It doesn't worry you any, not a darn bit. You leave that to me, you ungrateful, onery cuss."



# CLEMSON SPINELESS OKRA

By B. A. PEELING, '39

CLEMSON Spineless okra, developed at Clemson College and now coming on the market for the first time, has precipitated much interest in okra growing sections and has received a silver medal from the All-American Selections of 1939 because of its spineless pods.

Okra or gumbo (*Hibiscus esculentus*) is a tender plant belonging to the Mallow Family, which was introduced into the United States from Africa, and cultivated for its fruit-pods. These pods are used in soups, stews, and the like. When ripe, the black or brown, white-eyed globular seeds are sometimes roasted and used as a substitute for coffee.

Ever since its introduction, okra has been objectional to truck crop growers because of the many sharp spines found on the pods. It is, however, of considerable importance as a market-garden and canning crop.

The South Carolina Experiment Station has introduced a spineless okra, commercially known as *Clemson Spineless*, that evolved from a strain found in the state. Vice-Director R. A. McGinty, assisted by Professor F. S. Andrews, and Mr. L. E. Scott, had charge of this work. This okra is becoming a favorite in the South. All-American selections made by an agency which gives recognition to valuable plants developed by plant breeders, was started in 1932 by W. Ray Hastings, who then lived in Atlanta, Georgia. Now this organization is being conducted by the American Seed Trade Association. They have about twelve test gardens located throughout the country where new vegetables and flowers are tried out. Anyone having new plants of possible value may have this organization test them.

This promising new okra has had a fascinating history. It was in 1930 that Mrs. Dora D. Walker, Production and Conservation Specialist for the South Carolina Extension Service, sent Mr. McGinty some seed of an okra said to have spineless pods. This seed had come from plants developed by Mr. Thomas Davis of Lancaster, South Carolina, from a single plant found in his garden about fifty years ago. Plants from this seed have been observed and selected for spineless pods, and a number of types chosen. These selections have been grown several years to fix the spineless quality, and the best type seems to be *Clemson Spineless*.

This variety grows three and one-half to four and one-half feet tall in soil of medium fertility, and produces uniform dark green, ridged pods of good quality on plants with sparse foliage which makes

it easier to harvest. It resembles the Perkins' Green Pod type except that it has less foliage and more serrated leaves, is prolific and really a boon to pickers. *Clemson Spineless* is a distinct improvement over all other varieties.

Many gardeners and some commercial canners, such as Shellmore Oyster Products Company of Charleston, South Carolina, have grown this new okra and remark favorably on its taste and quality. Interest in the variety is spreading throughout all areas where okra is grown.

Mr. J. M. Jenkins of the South Carolina Experiment Station is now studying the inheritance of the various characteristics of okra with the aim of making further improvements.

The Associated Seed Growers, Inc., of New Haven, Connecticut and Atlanta, Georgia now distribute the seed of *Clemson Spineless Okra*. The Hastings Seed Company of Atlanta, Georgia and the Wood Seed Company of Richmond, Virginia advertise this seed in their 1939 seed catalogues.

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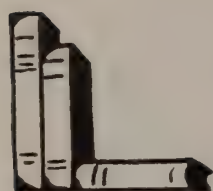
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# Agrarian Philosophy

By HARRIS L. BEACH, *Editor-in-Chief*



## SOUTHERN MEN OF DISTINCTION

The Progressive Farmer has honored Pieters of the southeast, Cooper and Schaub of the Carolinas and Hutcheson of Virginia by awarding these outstanding agriculturists the "Man of the Year" awards for 1938. Previous winners of this coveted award were Dr. Charles H. Herty, Dr. Julian A. Burruss, Keer Scott, and the late Dr. David R. Coker.

Dr. A. J. Pieters, apostle of lespedeza, has retired from the U. S. D. A. as chief of the division of forage crops. Dr. Pieters introduced new varieties of lespedeza into the southern states and with these varieties has made the crop fit the soil rather than the soil fit the crop. Not only by developing new varieties but also with speeches, books, bulletins, and pamphlets he preached the three-fold value of lespedeza which is valuable as a hay plant, as a pasture plant, and a soil builder.

Dr. Ira Obed Schaub of North Carolina has served his state efficiently in the three-fold capacity of Dean of Agriculture, State Director of Agricultural Extension, Acting Director of the North Carolina Experiment Station, and at present is the Dean of Agriculture. Prior to 1918 he was State Boy's Club Agent. In 1918 he was promoted to the position of Extension Regional Director of the Southern States. Dr. Schaub is keenly interested in a live-at-home program and soil conservation.

Next we come to Dr. T. B. Hutcheson of V. P. I., chief of the agronomy division. Dr. "Tom" as he is familiarly called, had the misfortune of losing his father while quite young. This put new responsibilities on him and he was compelled to work as a day-laborer for several years. Finally he heard of the opportunity of a boy working his way through V. P. I. and with his heart full of determination he entered and finally graduated at the top of his class. Dr. Hutcheson is noted for his ability to sift out important and practical ideas and present these basic principles to the average farmer in an understandable way. He is a constant contributor to The Progressive Farmer.

And lastly we turn to South Carolina's Dr. H. P. Cooper, Dean of the School of Agriculture and Director of the South Carolina Experiment Station. He is also President of the Association of Southern Agricultural Workers which convened in New Orleans the earlier part of the year. Dr. Cooper fathered the "Land Uses Survey" in South Carolina which took two million samples of soil and tested it for acidity. With a suit of overalls and a pair of post hole diggers in his car at all times he is constantly on the alert for checking soil samples. Dr. Cooper preaches the value of high-grade neutral fertilizers and talks to the farmers in terms of the "pH" value of their soil. Besides his many routine

duties he finds time for teaching and experimenting with manganese, magnesium, copper, and boron deficiencies.

## ANOTHER GREAT LEADER HAS PASSED

It is hard to realize that another great leader has passed. Just last December agriculturists everywhere lamented the death of Dr. David R. Coker of S. C., and now another great Southern agriculturist, Dr. Tait Butler, has passed on.

Dr. Butler was in his 77th year and had served The Progressive Farmer for nearly thirty years. Not only serving The Progressive Farmer vigorously but also as an agricultural statesman he fought the battles of southern agriculture winning for himself the title of "The Grand Old Man of Southern Agriculture."

In a statesmanlike manner, Dr. Butler fought for better pastures, abundant amounts of foodstuffs, increases in livestock, cattle tick eradication, and preached the economy of cottonseed meal not only for cattle but for workstock. Just a few years ago, Dr. Butler was the recipient of the American Farm Bureau's coveted medal "For Distinguished Service to American Agriculture."

## AGRICULTURAL WORKERS' MEETING

Many leading agricultural college men, experimental station workers, and extension specialists attended the annual meeting of the association of southern agricultural workers held in New Orleans during the early part of February.

A number of papers were read by outstanding men of the association. The keynote speech was made by Dr. H. P. Cooper, Dean of the School of Agriculture, Clemson College, and president of the Association.

The association is two-fold in its objectives. It aims first, to bring about a closer alliance of southeastern agricultural workers, and secondly, to offer a medium through which the latest developments in agriculture may be known. Aside from these preceding objectives, the association pays recognition to men who have made outstanding contributions to southern agriculture.

Approximately one thousand agricultural workers from the thirteen southeastern states attended this meeting. The association honored seven men who have made contributions to southern agriculture. Among this distinguished group was the late Dr. David R. Coker, prominent seed breeder of South Carolina.



## Breeding New Sweet Potatoes Sexually

By B. A. PEELING, '39

EXPERIMENTS conducted at the Clemson Horticultural Greenhouse have shown that sweet potatoes can be made to produce flowers and seed. Since seed can be produced, the sexual methods of plant breeding can be applied to the improvement of this crop. For the past three years a sweet potato breeding project has been underway at Clemson. This project is under the direction of Dr. J. B. Edmond, Associate Professor of Horticulture, the object being to breed improved varieties of sweet potatoes for South Carolina.

The sweet potato, as we all know, is grown for its large edible roots and for the commercial production of starch. Its native region is not definitely known, but according to leading scientists it originated in tropical America. It rarely produces flowers or seeds in the United States, but it does flower and produce seed in the tropics.

In the last year Dr. Edmond has induced Porto Rico sweet potatoes to bloom in the local greenhouse. They started to bloom during the first week of November, 1938 and have bloomed continuously until the second week of February, 1939. The flowers are perfect, but generally self-sterile, thus few seed are produced. Flowers are whitish to light pink with darker red strips along the veins. Sweet potatoes belong to the same family (*Convolvulus*) as do Morning Glories, so their flowers are similar. These flowers open in the early morning and stay open until the afternoon of the same day when the corolla closes and drops off.

The seeds develop in pods resembling those of Morning Glories, and there are from one to four seeds per pod. They are black, flattened, more or less disc-shaped, and angular in form. A relatively dry, tropical climate is apparently conducive to seed production. The experiments indicate that sweet potatoes are short day plants, since they produce more flowers and seed during short days of 11 to 12 hours daylight than during long days. Under such conditions carbohydrates accumulate, inducing the plants to go into the flowering phase of plant growth.

Five-hundred potato blossoms were artificially cross-pollinated by Dr. Edmond last fall. Out of these only twelve produced seed. These seed have a tough outer covering, thus causing irregular germination. To make more uniform germination, these seeds are treated with sulphuric acid. The seed will be planted this spring.

Sexual improvement has been used only for the past two years. The method seems to be a promising way to get new varieties of sweet potatoes.

## Concrete Facts

Concrete is a mass of fine and coarse materials, known as aggregates, which are surrounded and held together by hardened cement paste. If the paste is strong and the aggregates durable, the concrete is likewise strong and durable.

Concrete is fire resistant and does not decay very rapidly. It is reasonable in cost and can be constructed rapidly into various forms, and is found serving many purposes on the farm. A few of these are: building foundations, watering troughs, fence posts, water tanks, driveways, steps, walkways, floors, ornamentals, and silos.

For one-course pavements and thin sections a 1-2-3 mix is used, that is, the mixture is made up of one cubic foot, (one sack) of cement to two cubic feet of sand and three cubic feet of rock. Anything that is bulky should have a 1-2-4 mix. This mixture is used on jobs that are above the ground level. For underground foundations a 1-3-5 is used. The increase in rock makes this a stronger mixture.

The correct water-cement ratio is very necessary for good concrete. For thin sections about six gallons of water is used per cubic foot of cement. If it is to be exposed to moderate weather conditions, six and three fourths gallons must be used. For ordinary enclosed concrete seven and one half gallons makes a better ratio. Where the structure is to be completely protected from the atmosphere, such as basement floors, eight and one fourth gallons of water is used for each sack of cement.

Concrete should be free from all forms of organic matter and silt. The aggregate should be properly tested and cleansed before it is used. In making the silt test, an ordinary quart jar is used. The container should be filled to a depth of two inches with a representative sample of the sand to be tested. Add water until the bottle or jar is about three fourths full and shake vigorously for about one minute. Then level off the sand. Allow the jar to stand for an hour, during which time any silt present will be deposited in a layer above the sand. If this layer is more than one-eighth inch, the sand from which the sample is taken is not satisfactory for concrete work unless excess silt is removed by washing.

Concrete is being used more on the farm today than in the past. This is because the farmers are becoming better acquainted with the best methods of mixing it. They have also learned that it is a dependable building material and economical. Therefore, in the future concrete should be used to even greater extent.



# Growth in Agricultural Education in S.C. Since 1917

By T. B. ARDIS, '39

THE Smith-Hughes Act was signed by the late President Woodrow Wilson in February, 1917. The act was for organizing and financing Vocational Training in the schools throughout the nation. The money was to be used for payment, in part, of teachers and supervisors of agriculture, of teachers of trade, industrial and home economics, and for training teachers in those subjects. It was provided, however, that the instruction shall be limited to boys and girls over 14, pursuing studies of less than college grade; that the object of the teaching shall be to prepare the pupils for wage-earning occupations; and that all the work thus aided shall be under public supervision and control.

## *Organization of the Work in the Public Schools*

The system was first set up in South Carolina in July, 1917. One man, Mr. Verd Peterson, acted as teacher trainer and State Supervisor. His work began on July 11, 1917. He was appointed professor of Agricultural Education at Clemson with the understanding that at least one-half of his time for the fiscal year was to be spent in the work as State Supervisor. His entire salary and traveling expenses were paid by the College, and his services as State Supervisor were loaned to the State Board of Education. In January, 1918, Mr. W. G. Crandall, now head of the Agricultural Education department at Clemson, came from Cornell University to become Mr. Peterson's assistant.

The first task of the State Supervisor was to make a study of the teaching of Agriculture as it had already been carried out in the schools of the State. About the only form of work of this nature which had been undertaken had been done in Darlington County under the direction of Mr. J. M. Napier, teacher of Agriculture and Mr. D. L. Lewis, County Superintendent of Education.

After some study of this work in Darlington County, a study of the provisions of the State law for teaching Agriculture, and some conferences with the school and agricultural people of the State, the State Supervisor went about systematically to visit the most plausible sections of the State for teaching Agriculture. In these visits he became acquainted with the County Superintendents, County Farm Demonstration Agents, and the school trustees in the sections where the work was to be undertaken, and studied the possibilities of the work in these sections. In most cases the trustees of the schools had already made arrangements to spend all of their public funds for the fiscal year and consequently

most of the money to be used in the teaching of Agriculture had to be raised by private subscription.

Up to January 1, 1918, the State Supervisor had visited eighteen counties, and in all more than sixty schools and communities. Up to this time twelve groups of schools, including fifty-four schools in all had been organized for the work and the people had pledged more than \$6,000 in money for the payment of their part on the salary. Later a good many of the schools found that they were able to pay their part of the salary out of their regular school funds.

Arrangements had been made for employing twelve special teachers of Agriculture with one other man who has to spend a part of his time teaching Agriculture in a rural grade school.

The trustees and other school people of the state entered readily into the scheme and in few cases were there any indications that the regular teachers of the schools, or the trustees, did not have faith in the teaching of Agriculture as a part of the public school activities of the State.

In nearly all cases graduates of State Agricultural Colleges were secured as teachers and the work was well under way in the schools when they opened after the Christmas holidays.

## *Type of Work*

During the first year, two hundred and ninety pupils were enrolled in Agriculture under the provision of the Federal law. Each of these pupils grew some kind of crop under the direction of the teacher of Agriculture. The total of about 385 acres of field and garden crops were produced by these pupils. Since the Federal Law requires the pupil to be at least fourteen years old, most of them were enrolled in the high schools of the State.

The personal contact of the pupil, teacher, and parent brought out by the supervised practical work the pupil does at home proved to be an essential part of the plan. This practice work is required by the Federal Law, and in most cases the pupils enter heartily into it. While the purpose of these projects is educational rather than for the production of farm products, the tendencies of agricultural activities in the State are no doubt reflected by the agricultural pupils in the choice of their projects. Many of the teachers of Agriculture make careful surveys of the boys' home farm in an effort to help him decide what project he should undertake. It is the aim of the work to fit the project to the conditions



and accommodations on the home farm, as well as to the farming activities and marketing possibilities of the community. The agricultural project is a part of one phase of the process of teaching agriculture. However, the project offers the greatest opportunity for teaching when it is a real piece of farm work fitted in to the scheme of the farm. In so far as possible, the interest of the individual pupil is considered in order that the pupil may have the greatest incentive to get the most possible out of the work.

After this work had been continued for a period of years it had a tendency to improve the methods of farming in this State more effectively than any other agricultural scheme which has been undertaken. This work takes the boy at his pliable period of life, gives him the best theories for farming, follows him to his home farm and helps him put these theories into operations.

#### *Present Set-Up*

Notwithstanding the fact that it is a relatively new development, Vocational Agricultural Education has advanced in this State by leaps and bounds since its beginning in 1917, until now it is one of the leading phases in the field of education. The number of agricultural teachers in South Carolina has increased from thirteen in 1917, to 200 at present. Not only has there been an increase in the number of schools teaching agriculture, but there has also been a tremendous increase in the enrollment of farm pupils studying agriculture in these schools under the Federal Law.

To meet the demand of this increasing situation, it is imperative that we have an able staff of supervisors. Still standing at the head, is Mr. Verd Peterson. He had held this post as State Supervisor since the beginning of Vocational Training in 1917. He deserves much praise for the excellent work he has done in behalf of Agricultural Education. But one man can no longer supervise the extensive work now being carried on. To aid Mr. Peterson he has four assistants, Mr. J. L. Sutherland, Asst. State Supervisor; Mr. R. E. Naughn, Mr. E. R. Alexander, and Mr. R. D. Anderson, District Supervisors. The State Supervisor and assistant State Supervisor are now located in the State Department of Education, Columbia, South Carolina.

#### *Growth at Clemson*

Vocational Agricultural Education was first introduced at Clemson in September, 1917. It was established as the Division of Agricultural Education under the Department of Agriculture, and continued as such for sixteen years. Dr. F. H. H. Calhoun, now Dean of the School of Chemistry and Geology, was the head of the Department of Agriculture then, and was instrumental in getting Educa-

tion started at Clemson. Dr. Calhoun also taught the first course in teacher-training at Clemson.

When Mr. Peterson became State Supervisor he was appointed professor of Agricultural Education at Clemson. He served as Head of the Division of Agricultural Education until 1921, when his assistant, Mr. W. G. Crandall, took over the position. Mr. Peterson then devoted all his time to his duties as State Supervisor. Mr. Crandall has continued as head of the Agricultural Education Department since that time.

The department has continued to grow, and in 1933, the School of Vocational Education was set up at Clemson. Mr. W. H. Washington, who had previously been Registrar at Clemson, was made Dean of that school. Agricultural Education has been the outstanding department in the School of Vocational Education.

There are now 280 students enrolled in this course—101 Freshmen, 64 Sophomores, 64 Juniors, and 51 Seniors. Through the ability and leadership of the Agricultural Education faculty we have seen the enrollment steadily increase.

At the present rate it might seem that the field would soon be filled. This is not true. Of the 15,000 rural high schools in the United States, only about 10,000 have Agriculture Teachers. In South Carolina there are approximately 300 schools which need the work, but less than 200 teachers to fill the positions. It is true however, that we have gone about as far as the present funds will carry us. Some provision must be made to carry on the work in the near future. So, in this democratic country where everything possible is done to give to all an equal opportunity, it would not be too much to expect additional funds to be made available in order that all schools may have an Agricultural teacher if they so desire. There is every reason to believe that the work will go on, advancing continually, until this goal is reached.

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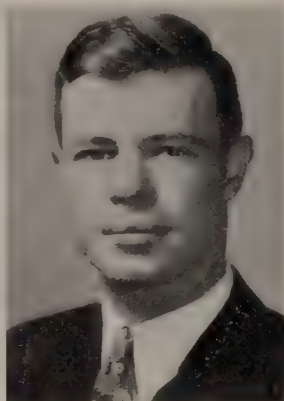


# Agriculture's Related Industries

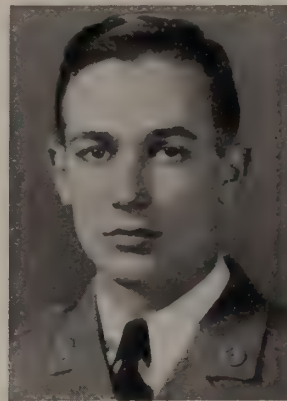
## Agriculture and Chemistry

Today grown men are trying to answer the mystery behind the child's question, "Why is grass green?" Inside of the leaf of a plant is a method of converting the carbon dioxide of the air and the water of the earth into carbohydrates — the chemical compounds that are the source of most of our food energy. The man who first does what the lowest plant does every day will be forever famous. In the solving of that one problem, man will open a vast new field that will enable him, without touching a plow, to make his own starch, his own cellulose, his own sugar, and the many derivatives that are prepared from them. Does that mean that chemistry is the enemy of agriculture? That chemistry is but awaiting a time when more knowledge is available to replace agriculture? No, it does not. Even when (and if) the problem of the synthesis of carbohydrates from carbon dioxide and water is solved, and the equally difficult problems surrounding the promotion of the process on a commercial scale are also solved, the bug-a-boo of cost is there. It is highly improbable that man can ever duplicate the ease with which nature nonchalantly makes the conversion. Instead there will, in all probability be the cost-demanding requirements of high pressure and of extremely high or extremely low temperatures. In all probability, the process will be like the many chemical processes of today: many of them that at first glance seem to be harmful to agriculture are on closer observation found to be helpful supplements instead.

Chemistry today as a whole has three rather important functions in connection with agriculture. First there is the matter of finding new uses for the crops of today. Instead of cotton being used only in the production of the rather rough cotton fabrics of not so very, very long ago, the whole plant goes to the production of a myriad of articles. The all important lint goes to the production of fabrics that vary from cheap, rough bagging to the soft, silky rayons that are the result of the several pro-



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## Agriculture and Textiles

A broadcasting station in one of our South Carolina cities terms its location, "Where Agriculture and Industry Meet." That slogan could well be adopted by South Carolina, and by the South.

Farming has long been the predominant occupation of the South, and, relatively speaking, industries such as the textile are merely in the embryonic stage of development here. However, in the few years since the beginning of the exodus of the textile industry from New England to the southern states conditions have improved markedly. The farmer now has a substantial and convenient market for his principal crop. The manufacturer has a dependable supply of raw materials at his disposal, and has discovered that a reasonable part of his market is at his front door.

Living conditions in our rural communities are said to be the nation's number one economic problem. The conditions under which the vast majority of textile employees live are just as deplorable as those of the Southern farmer. At present, outside aid is supposedly being administered to both of these groups by helpful legislation. However, the relief being supplied will have only a temporary effect. Something must be done within our section to remedy our own conditions.

The shuttle, which darts back and forth through the warp, is made of the same materials, wood and steel, as is the plow which glides and glitters through our soil. The men who employ the two instruments are brothers. Each has a different task to perform, but one is the complement of the other.

Therefore, Southern Farmers, and Southern Mill Men, let agriculture and industry meet, join hands and hearts in a common purpose, to enhance the advantages of living in the South.

cesses now used. The seeds may be made into a flour that is non-fattening because of its low starch content and the oil pressed from them may be made into edible oils, into fine lards, or into substances

(Continued on page 37)



# Let's Pull Together

By HARRIS L. BEACH, '39

WHY should we cooperate in our financial enterprises? Does it really pay individuals or small concerns to pool their orders and practice cooperative financing, buying, and selling? These questions confront many individuals. To a large extent answers to these questions indicate factors which may make or break not only such individuals as you and me, but also many manufacturing and processing concerns. In former years very little data relative to cooperatives were available. Fortunately however, we have facts today to show the advantages of cooperation. The result is cooperatives from Maine to California and from Minnesota's dairies to the Texas range, all striving toward the same objective—more profit and less risk.

Cooperative associations and public ownership aim to provide commodities or services at cost to the public or to all who are members of the cooperatives. The business of cooperatives is two-fold; namely, dealing with the public and with the members. They have gained rapid headway in Europe, but have progressed to a lesser degree in this country. Their present importance is but slight in comparison with that of proprietary enterprises and corporations.

The distinguishing feature of cooperatives is the democratic operation and control of the enterprise to the best interests of the people directly concerned. Democratic control is insured and maintained by allowing each member only a single vote. In this way no one member or clique is able to dominate the concern. By-laws sometimes govern the capital holdings of members in order to further insure equality of participation.

Few cooperative associations require large amounts of operating capital, so membership fees of ten to twenty dollars usually meet all financial needs. On the other hand, where considerable equipment is necessary in order to facilitate proper and smooth functioning, a corporation is organized and the funds are raised by means of stock issues. Whether small or large, fees and dividends are distributed according to the amounts risked and the amounts invested.

In practically every field, we have cooperatives doing well. In the field of production, however, they seldom function properly. Several attempts have been made to carry on agriculture in a cooperative way but almost always with disastrous results. As

a general rule, this results from managerial inefficiency of the members and opposition to bringing in fairly high-salaried executives to carry on the business. It is absolutely essential to have administrative talent in any sort of cooperative in order to make a go of it. We have "producers cooperatives", but as a general rule this type of cooperative deals primarily with the marketing of products. Another type is the consumers' cooperative. It aims to purchase the needed goods collectively in order to do large-scale buying and cut out the middlemen.

Let us look at the cooperative movement in the United States and observe the business being done. According to the Farm Credit Administration of the United States, there were in 1933 11,000 cooperative associations handling and marketing farm products and transacting business to the value of \$1,340,000,000. There were approximately 3,000,000 farmers connected with these cooperatives. With this large number doing business, it can be said safely that cooperatives have passed the stage of experimentation and are firmly established as a safe method of dealing together collectively.

## What Is Cotton?

Cotton is the overcoat of a seed that is planted and grown in the southern states to keep the producer broke and the buyer crazy. The fibre varies in color and weight and the man who can guess the nearest the length of a fibre is called a cotton man by the public, a fool by the farmer, and a poor business man by his creditors.

The price of cotton is fixed in New York and goes up when you have sold and down when you have bought. A buyer working for a group of mills was sent to New York to watch the market, and after a few days of deliberation wired his firm to this effect: "Some think it will go up. Some think it will go down. I do too. Whatever you do will be wrong. Act at once."

Cotton is planted in the spring, mortgaged in the summer, and left in the field in the winter.

*What Isms Do To 2 Cows*

The following was composed by a Western Man—Dolly K. Yancy.

*Socialism*: If you have 2 cows, you give your neighbor one of them.

(Continued on page 34)



## Taxes and Trade in S.C.

By CHARLES M. AULL, '39

THE legislature of South Carolina is now faced with the difficult problem of increasing government revenues approximately four and one-half million dollars. Probably the most widely discussed proposal for raising this huge amount is that of levying a general sales tax. In a study of any special type of tax, it becomes necessary to analyze *all taxes*, as they all have much in common. They are all part of government action intended to bring revenue to the state. A tax policy should and must be shaped so as to produce sufficient revenue for the government. In addition, as Andrew Mellon states in his book, *Taxation, The People's Business*, a tax should be designed with regard to conditions over a long period of time. That is, there should be some fairly definite policy or plan of taxation. Further, tax should be in proportion to ability to pay, according to Adam Smith in his book, *Wealth of Nations*. It is generally agreed by students of the subject that these are traits desired for any tax. A new development in what may be expected of a tax system is the removal of influences which might retard the development of business and industry. The place of the general sales tax with respect to these expected principles is important.

"A sales tax" may be defined as a tax arising out of the sale of property. Sales taxes may be divided into "general" and "selective". Selective sales taxes are taxes on sales of certain commodities, while the general sales tax is a tax on sales of all commodities or services falling within a certain class. The general sales tax is most important and must be measured for characteristics which a good tax should have.

The general sales tax can and will produce for state governments a large amount of revenue within a short time. Its flow of revenue will vary but slightly with business activity and the payment of this form of tax makes the public more tax conscious and creates interest in government.

The sales tax, however, fails to take account of ability to pay. People of lower incomes, pay a much larger percentage of their total income in taxes than do the wealthier people. In addition the sales tax makes no provision for different sources of income nor of the obligations of the taxpayer. It is logical that a person with heavy family obligations should be required to pay less taxes, but with a sales tax he must pay more. Where the tax cannot be shifted to consumers, it must be borne by the merchant, and this often becomes an unbearable load especially for small merchants. It is easy to

## TULAREMIA

By F. T. ARNOLD, '39

Zoology and Entomology

TULAREMIA or Rabbit Fever is a disease contracted by human beings in the handling of cotton-tail rabbits especially in the handling of the pelts. This past year has seen a great increase in human infection over the United States. The severest infection was in Illinois where official records show at least 10 persons dead and 243 ill since the hunting season opened. Texas reported 75 cases, Utah 73, and Iowa 68 cases. Many other states reported many persons attacked by this disease. While South Carolina escaped any serious outbreak this year, it will be well to look out for an increase the coming year. This disease has increased among the rodents and has in several areas become epizootic. It was first noticed in 1904 in California and receives its name from Tulare County. Several cases have been reported from time to time, but only in the last few years has Tularemia reached national prominence.

There are several types of Tularemia, but about 80% of the cases fall into the Ulceroglandular type. The symptoms appear in 2 to 11 days after infection, but usually in 4 to 5 days. Frequently the onset is sudden and it is generally accompanied by alternate periods of chilly sensations and fever. There may be a frontal headache and the eyes may be sore to the touch. Perspiring is profuse and there is usually a backache and shifting pains in the muscles. The patient is very weak. The lymph glands that drain the site of the infection soon swell and at the point of the entrance of the disease an ulcer is formed. If the infecting agent is a tick, the ulcer may be formed on any part of the body. If caused by the bite of a Deer Fly it is usually on some exposed part of the person. If contracted from skinning a rabbit it is usually on the hands. The ulcer starts as a small pimple and increases in size and finally the center becomes necrotic, finally opens and leaves a "punched out" area with the edges elevated.

(Continued on page 37)

assume that a tax on sales will result in decreased sales and decreased business activity. Thus the tax kills the goose that lays the golden egg. A further damaging argument against the sales tax is that those states which now have such a tax are engaged in as frantic a search for revenue as is South Carolina.

In conclusion, weighing the advantages of the tax against its disadvantages, it appears that the sales tax is a burdensome measure which should be avoided.



## Regional Vegetable Breeding for the Southeast

By C. SALVO, '39

The U. S. Regional Vegetable Breeding Laboratory at Charleston, S. C., was established by the Bureau of Plant Industry of the United States Department of Agriculture under authority of the Bankhead-Jones Act, early in 1936. It was the first of several regional laboratories designed to deal with specific major agricultural problems of large regions or divisions of the United States. Upon the recommendation of the Office of Experiment Stations of the United States Department of Agriculture and the State Agricultural Experiment Station Directors of the 13 states constituting the Southeastern Region, this Regional Laboratory attacked the problem of breeding varieties of vegetables better adapted to the climate and soil conditions faced by southern vegetable growers and home gardeners. These new varieties must also be resistant to certain diseases, of high quality, and well-adapted to the use for which grown, whether for local consumption, shipping, or processing.

The laboratory activities are conducted in cooperation with plant breeders, vegetable specialists, and plant disease specialists of the State Experiment Stations of the 13 Southeastern States.

On March 1, 1936, representatives of the United States Department of Agriculture met with collaborating specialists from the 13 states at Charleston and agreed on the specific problems to be undertaken in the beginning. Other meetings were held in January, 1938 and January, 1939, to discuss progress made and plans for the future.

### *Plant and Equipment*

The Vegetable Breeding Laboratory is situated on the Savannah Highway (U. S. Route 17) 7 miles west of Charleston. The buildings consist of a laboratory and office building, two greenhouses and a head house, barn, implement shed, and four residences. About two hundred acres of cleared land are available and part of the farm is in woods, so that necessary isolation plots can be established and maintained.

A small amount of permanent overhead irrigation has been installed, as well as a portable system capable of irrigating about 35 acres at one setting of the pump. Necessary farm, laboratory, and other scientific equipment is being added as needed.

### *Personnel*

The scientific staff at present consists of Dr. B. L. Wade, genetics; Dr. C. F. Poole, cytogenetics; Mr. C. F. Andrus, plant pathology; Dr. S. A. Morell,



Left—  
The  
Laboratory  
Staff



Below—  
Experiment  
Station  
Buildings

biochemistry; Dr. G. B. Reynard, botany; and Messrs. Paul Grimbail, Leo Blicht, and Wilbur Borom, scientific aides. A secretary and necessary laborers are employed.

At the present time work is under way with snap beans, tomatoes, cabbage, watermelons, and sweet corn. In addition, minor work is being done with some other crops in order not to lose valuable introductions, especially from foreign countries. All the work has for its aim the development of varieties especially adapted to southern conditions—climatic, soil, disease, insect, market requirements, etc. The specific problems vary from crop to crop but, in general, they are problems of disease resistance, regional adaptation, and quality.

The U. S. Regional Vegetable Breeding Laboratory at Charleston is developing into an experiment station for experiment stations, as well as for vegetable growers. It is here that new introductions, especially those from the Division of Plant Exploration and Introduction, of the Bureau of Plant Industry, are being tested for disease resistance, hardiness, and other characters. It is planned to send out to the cooperating plant breeders pure lines of promising material as well as segregating generations resulting from crosses. In

(Continued on page 36)





# BETWEEN THE

## NOTED ECONOMIST VISITS HERE

Mr. J. G. Crawford, B. Ec., who is a professor of Rural Economics in the University of Sydney, Sydney, Australia and a representative of the Rural Bank of New South Wales, was a guest of the Agricultural Economics Department here recently. He is in the United States to study the agricultural credit conditions as there is no farm credit administration in Australia comparable to ours. There are, however, a few commercial banks which take their place, but not so efficiently as our credit administration.

Mr. Crawford's visit to Clemson terminated his study of the South Atlantic States, which were only a part of the leading agricultural states to be toured in his twelve months stay in the United States.

## DAIRY CLUB

The Clemson Dairy Club, organized in 1922 by Professor Goodale, is endeavoring to benefit the Dairy Department by donating gifts which will be of lasting value to the succeeding club members. In addition to framed pictures of the club members, which have been given in the past, the club is now raising money to purchase this year's annual, "Taps". This example is expected to be followed by the future club members.

This, however, is not the only recent achievement that the present members have made. They, for the first time in the history of the club, have drawn up and adopted a constitution and have included a parliamentarian among the officers.

## ANIMAL HUSBANDRY CLUB

Recently the Animal Husbandry Club enjoyed a visit to Mr. Marrett's farm near Westminster, where they studied his registered Hereford herd. The club is also planning a trip to Balentine's packing plant in Greenville in order to get a more vivid impression of the marketing procedures of cattle and hogs.

At a recent meeting the club made plans to have, in addition to the frequent socials, several barbecues and picnics later in the year when the weather is more favorable.

## BULL DEBUT

Carnation Imperial Dione, whose home was originally the Carnation Milk Farms, large Holstein dairy farm of the Carnation Milk Company, Seattle, Washington, is a newcomer to the college dairy herd. After a 3500-mile trip this fine yearling bull arrived at Clemson as fresh as one of the Shasta daisies of his native West. He was feeling fine in spite of quite wintry weather encountered along the way.

Dione would be more properly called "Butch". He is a he-man, the son of an "All-American" bull and a descendant of the greatest-producing family of cattle ever developed. He promises to contribute much to the improvement of the outstanding Holstein herd operated by the Clemson College Dairy Department.

Dione is being used in an artificial insemination project being carried on by the Dairy Department.

## BASKIN IN EXTENSION WORK

Mr. Jack S. Baskin, the former cadet Brigade Commander, accepted, before his graduation on February the sixth at the end of the first semester, a position in the extension service. He began work immediately upon graduation as an assistant in the extension headquarters office here at Clemson.

Among other changes in the extension service of late was the appointment of Mr. L. B. Massey, County Agent of Orangeburg County to the district extension agent of the fifteen piedmont counties. Mr. Massey succeeds the late Mr. A. A. McCowan. Mr. T. F. Suber, County Agent of McCormick County, is replacing Mr. Massey as County Agent of Orangeburg County and in turn Mr. D. A. Shelley, assistant county agent of Aiken County, is replacing Mr. Suber in McCormick County.

## GRANGE HEARS WILLIAMS

On February the tenth Dr. B. O. Williams, Professor of Agricultural Economics and Rural Sociology, addressed a meeting of the "Bounty Land" Grange chapter Oconee County. He spoke on the Social problems of South Carolina with special emphasis on this section of the state.

Dr. Williams pointed out that as a result of the high tenant mobility in the state that a plan must be derived to enable tenants to attain greater stability and also a practicable and workable live at home program must be formulated. Another important problem brought out by Dr. Williams was the fact that the South Carolina farm youth is in sad need of improved education facilities.





# FURROWS

## ALUMNI NEWS

*J. R. Pritcher* of Hebron, S. C., graduated from Clemson at the end of the first semester, 1938-39 session. Pritcher is now the teacher of Vocational Agriculture at Holly Hill, S. C.

*F. M. Whitlock*, who graduated in January, 1939, is now teaching Vocational Agriculture in Woodland, N. C. Whitlock is from Easley, S. C.

*V. A. Ballard*, who graduated in January, 1939, now has a job with the Springs Cotton Mill at Fort Mill, S. C.

*C. W. Prince* of Six Mile, S. C., who graduated from Clemson at the end of the first semester, 1938-39 session, is now a teacher of Vocational Agriculture at Providence, South Carolina.

*J. R. Townsend* of Blenheim, S. C., is now teaching Vocational Agriculture at St. George, S. C. Townsend is a member of Alpha Tau Alpha, an honorary fraternity.

*J. F. Chandler* of Seneca, S. C., a Civil Engineer graduated in January, 1939, now has a job as a draftsman with the South Carolina Highway Department.

*E. A. Marvin* of Green Pond, S. C., who graduated in January, 1939, in Animal Husbandry is now employed by Mr. C. F. Prettyman. Marvin is in charge of Mr. Prettyman's fine stock at Summer-ville, S. C.

*M. M. Miller* of Charleston, S. C., an Industrial Education graduate, is now teaching woodwork in Anderson, S. C.

*G. H. McCarley* of Anderson, S. C., an Animal Husbandry major, C. H. Sweat of Walterboro, a Vocational Agricultural Education major, R. C. Heyward, a Textile Engineer major, and J. H. Lever, an Animal Husbandry major, all graduated from Clemson in January, 1939.

*W. H. Stokes* of Greer, S. C., graduated from Clemson in January, 1939. A member of Alpha Tau Alpha, Stokes is now teaching Vocational Agriculture in Olanta, S. C.

*M. T. Hambright*, graduated mid-semester in Vocational Agricultural Education, and is now teaching agriculture at Johnston.

*Boyce Miller* graduated in '38 in horticulture and enrolled in Vocational Agricultural Education for the first semester, is now Assistant County Agent of Cherokee County.

*H. E. Miller*, class of '38 is now employed by the Farm Security Administration.

*J. M. Dupre*, class of '38, is now doing herd testing work for the S. C. Extension Service.

*Dr. O. B. Garrison*, class of '34, is now employed as Assistant Horticulturist at the Edisto Station.

## "CANE CUTTER" INVASION

One of the latest phenomena to attract Clemson zoologists is the appearance of "cane cutter" rabbits in western counties of South Carolina. Professor Franklin Sherman, head of the Department of Zoology and Entomology, says that a long, rangy rabbit, believed by some to have migrated to this section from the Gulf Coast states, has been known by hunters for some time.

Until recently, there have been known two species of rabbits in the state. They are the common cotton tail, which is found over the entire state, and the swamp rabbit, found in the eastern half of the state.

Professor Sherman has sent one of the newcomers to Washington in an effort to determine definitely whether or not we have an entirely new rabbit. That this is one of the true cane cutters native to the Gulf Coast region is not known.



# Growth Promoting Substances

By CLEM MILEY, '39

FOR many years scientists have known about hormones, or gland secretions in animals. These amazing chemical substances have various effects on the body, depending on which glands secrete them. Scientists have found by extensive investigation that many of the body processes are controlled and regulated by these hormones. In animals hormones are produced by definite ductless glands within the body. Each gland secretes a certain definite hormone which has a specific effect on the body processes. For example: The thyroid gland located in the neck, secretes a hormone containing iodine. When our food contains insufficient quantities of iodine, the thyroid gland enlarges in an effort to manufacture enough iodine for the body. This enlarged gland is known as goiter.

Recently, scientists have discovered that plants as well as animals have hormones. These substances promote growth and are called auxins. Their effects are similar to those of animal hormones. As yet no definite glands for the production of plant hormones have been discovered, however, it is known that these substances are produced in the buds and tips of actively growing stems.

Scientists have discovered that certain chemicals affect plant growth in much the same way as the plant hormones. They are called growth promoting substances. One of the most commonly used is indolebutyric acid. Already nurserymen and gardeners are using these substances rather extensively. By the use of these growth promoting substances, cuttings may be rooted from plants which are ordinarily difficult to root.

## *Experiments Prove Successful*

Many experiments with these growth promoting substances have been carried out with remarkable results. Cuttings from most species of plants have been found to respond to treatment with growth promoting substances. Plants that before could be rooted only with difficulty can now be rooted easily. In most cases the treatment induced more roots in a shorter period of time, regardless of whether the variety was normally difficult to root or normally easy to root.

E. W. McElwee at Auburn, Alabama conducted an experiment in 1937, in which 23 southern ornamental plants were treated for from 3 to 48 hours with growth-promoting substances. Four growth-promoting substances, indolacetic acid, indolebutyric acid, indolpropionic acid, and phenylacetic acid

were used in concentration of 5 and 10 milligrams of acid per 100 cubic centimeters of water.

The result from two series of treatments show the following: Of the four growth-promoting substances used, indolbutyric acid gave consistently better results both in the percentage of cuttings rooting and the extent of the root system.

A comparison of the treatments giving the highest rooting percentage and the largest root systems indicates that when a concentration of 5 milligrams of acid per 100 cubic centimeters of water is used cuttings ordinarily easy to root should be treated 6 hours, those moderately hard to root 12 hours, and those hard to root 24 to 48 hours.

The treatment of cuttings ordinarily easy to root gave a larger root system but did not materially increase the percentage rooting. The treatment of cuttings ordinarily hard to root, however, gave a decided increase in percentage of rooting and a larger root system. Treated cuttings of five plants ordinarily hard to root showed an average increase in rooting of 61 per cent over untreated cuttings. For example, in experiments with pyramidal arbovitae ninety per cent of the treated cuttings rooted against forty per cent for the untreated cuttings. Eighty per cent of the treated Red Firethorn cuttings rooted against twenty per cent for those untreated. With American Holly, treated cuttings rooted fifty-three per cent against none for the untreated. Tests have shown that the effectiveness of the treatment varies with the concentration of the material used. Considering the wide range of effective concentrations varying with the variety of plants tested, no single treatment can be recommended for all varieties. In general, dormant hardwood cuttings require a stronger concentration of growth promoting chemicals than softwood cuttings.

Some chemical compounds known to accelerate root formation are indolebutyric acid, indoleacetic, indolpropionic and naphthaleneacetic acid. Naphthaleneacetic and indolebutyric acid have given best results. These growth promoting substances are on the market under a variety of trade names.

Neither special skill nor special apparatus are needed to obtain satisfactory results with these growth promoting substances. Almost anyone can do it.

(Continued on page 35)



# FARM TENANCY

By DR. B. O. WILLIAMS

FARM tenancy as we know it in the South was known to represent the effects of unfortunate circumstances and events long before it began to generate its own evil influences. If anything is to be done about farm tenancy (and something certainly needs to be done) the attack must be directed against the conditions in which it breeds and under which it thrives. Tenancy in and of itself is not an evil, and while a large degree of ownership may be beneficial to society, not a few individuals recognize superior advantages to themselves in a rental contract. The way to reduce the amount and proportion of farm tenancy is not by presenting everyone or even any appreciable number of individuals with farms, but by making farm ownership more remunerative and more permanent. With a more attractive goal ahead, anyone who desires and is qualified to do so should be encouraged to move gradually (one step at a time) toward the stability of ownership. The following are offered as specific recommendations and suggestions:

The economic position of agriculture can and must be improved by whatever means available, to bring about a greater freedom of trade, to prevent speculation in land, to permit classification of land for purposes of taxation, zoning, etc., and to give effect to any existing and prospective measures and practices which may have proven or might prove effective toward this end.

The frequent movement of tenants must be checked by the perfection of longer leasing agreements mutually beneficial and satisfactory to landlord and tenant.

The extension of public services into rural communities is recommended as a means of raising the standard of rural living. Community, County, State and even Nation-wide library service, recreational opportunities, parks playgrounds, and fish preserves are suggested. In some cases publicly supported medical and hospital facilities would be needed.

Greater emphasis should be placed upon the part which can be played by the professional farm manager, operating under a system of profit-sharing, as a stepping stone to ownership for those capable of taking the step, and as an aid to those who cannot or will not become owners.

More latitude is needed in the making of production loans and loans on livestock and lands. An extension of the duties and responsibilities of present lending agencies, while at the same time safeguarding the rights of the investing public, would obviate

the necessity of introducing further conflicts into governmental structure. 'The man who pays the fiddler has the right to call the tune' and without doubt the lending agency should be given the power to supervise the program and activities of those who benefit by it. On the other hand, if those who are assisted in becoming owners are to be enabled to lose their identity as tenants, they must not be subject to special and conspicuous attention by a different supervising agency from that which advises with and shapes the policies of their neighbors.

This entire program should be launched upon the basis of the best available information and carried forward at such a rate and in such directions as may be determined by thorough scientific research and experimentation.

"From A Snack To A Banquet"

## THE CLEMSON GRILL

Clemson, S. C.

## THE SOUTH CAROLINA NATIONAL BANK

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# Do's and Don'ts About Farm Machinery

W. H. MANNING, '40

Don't put off repairs until tomorrow that can be done today; a repair in time will save a pocket full of dimes.

Never use pliers or pipe wrenches on square headed nuts; always use adjustable or end wrenches.

Don't try to loosen a rusty bolt until oil has been applied; it may wring off.

Keep machinery well lubricated at all times, because lubricants are cheaper than machinery.

Keep oil strainers clean, they are designed to catch a certain amount of dust and no more.

Before starting a motor be sure that oil, fuel, and water have been checked.

Keep air, intake, and exhaust outlets clean at all times.

"Why ride a clutch?" Use other means of transportation, they will carry you further.

Farm implements are like humans, never leave in the weather.

When the season's work is over check your machinery and replace all worn, broken, or deficient parts immediately, it is cheaper then than later.

Don't buy machinery for the namesake, be sure that the purchase will be profitable.

Never overload machines; they can be strained as well as humans.

Never work on horse-drawn machinery while the horses are still hitched to it, they are never too old or gentle to run away.

Be sure that a repair part is made for your machine, and do not apply an unreasonable amount of force in replacing it.

Be careful while working around machinery, "accidents will happen", even the simplest machine is very dangerous.

Always study, very carefully, the instruction book that is furnished with a machine, and abide by it.

Keep belt drives clean; this is done by keeping oil, water, soap, resin, and grit off of them. Use only the very best belt dressing on belts, it will pay in the long run.

Never try to put on, or take off, a belt from a moving pulley with the bare hand.

## For Better Farming

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Manganese Sulphate—the "Green" Element, increases yield, improves flavor and shipping qualities. Fertilizer grade mixes well with other materials; Spray grade finely ground, easily applied.

Copper Sulphate—the "Activating" element, builds up copper deficient soils that stimulates growth. The product you need for homemade "Bordeaux."

Copper Fungicides — widely and successfully used as spray or dust to control fungus diseases of fruit trees and vegetables.

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## “Back When”

By I. J. FOSTER, '39

THE Clemson College Dairy Department's variety of fine products is no new development. As far back as 1908 delicious, prize-winning butter was produced regularly in the creamery by Clint Taylor, now a resident just west of the main campus on the Seneca highway. A sample of Mr. Taylor's butter sent to Chicago about 1913 and entered in a national competition was awarded a silver medal as the nation's second best butter. When Mr. Taylor started work as a butter maker in the college creamery, it was a stone foundation, frame building situated in the deep hollow just behind the chemistry building.

It was under J. M. Burgess, a Clemson graduate, that both the Animal and Dairy Husbandry Departments functioned as one. At that time the dairy herd consisted of a total of about fifty head of cattle, including Jerseys, Holsteins, Ayrshires, and grades. The herd proper was kept where the present farm barn is located, and a small experimental herd was maintained at the sheep barn. Convict labor was used to care for the main herd, and the milk, hand drawn, was sent to the creamery by wagon.

When the milk reached the creamery it was cooled on an external tubular cooler, in which the cooling medium was ice water. Ice was brought from Calhoun, where it had been sent by train. Water was obtained from a spring nearby, which has since gone dry. This water was circulated through a concrete tank in a room of the creamery where the milk was kept cool in ten gallon cans. This milk, together with the creamery's output of butter, was sent to the mess hall for cadet consumption. Today the creamery's butter, which is

churned entirely from sweet cream, is retailed to the campus trade.

A boiler room was the source of steam for a steam engine. The power produced was transmitted through a shaft to the churn room, where the churns were operated by belts. In this room the cream for butter was separated, ripened, and churned.

Clemson College butter in those years was a superior product that consistently took first prize at various fairs and contests throughout the state.

A variety of cheeses was made in the building. These, however, were of student manufacture, produced in the laboratory room. They were kept, together with butter and milk, in the “spring room”.

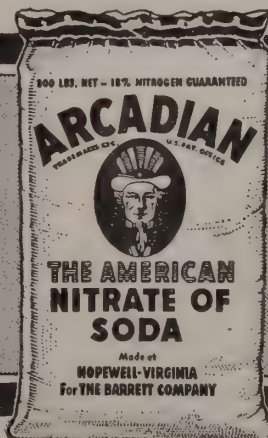
In 1912 the new dairy building, which is still in use, was completed. It was in this building that Mr. Taylor, at the suggestion of Professor Burgess, started careful preparations for a special churning of butter. After obtaining the best cream available, he sat up all night waiting for exactly the proper acidity to develop. Selecting one of the small churns used by students, he churned about ten pounds of butter. When the butter “came”, he worked it in a small worker which he had made specially for the venture. Packaging the butter carefully, he sent it to Chicago in his own name. It was feared that in such stiff competition the butter, if sent in the college's name, might reflect unfavorably upon the institution. The silver medal it received was; therefore, quite a pleasant surprise both to Mr. Taylor and Professor Burgess.

A part of the original stone foundation of the old creamery remains in the hollow today. Perhaps this will satisfy the curiosity of many persons.

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New Orleans, La.



## Clemson — 1950

Clemson, S. C.  
April 30, 1950

Dear Lee,

Clemson has certainly changed since the old days way back in '39. I've been here for some refresher courses, and I'd like to tell you about my stay here.

I arrived here with the boys as they were returning from spring holidays. At the guard room they sent to the new 100-room dormitory for guests, "Tiger Hotel". It accommodates 200 persons in rooms and has a downstairs overflow hall with rows of double bunks. It's where old Riggs Field used to be, by the old "new barracks". It is of about the same construction as those barracks except that the doors are soundproof. The new stadium is situated just west of this building and the barracks, running north and south. "Tiger Hotel" is used for high school 4-H Club boys, Future Farmers of America, girls up for dances, parents, cadets's guests in general, and short course students, including mechanics, shop foremen, farmers, former students, etc.

I've been having two classes a day in dairy plant work, and a great deal of the rest of the day time I've spent in the creamery. The plant now makes butter and cheese for the mess halls, condensing surplus skim milk with the most modern powdering equipment.

I've also been looking over the cattle a bit at the new Agricultural Center. This is a roofed arena enclosing an area nearly as long as a football field and wider. Behind the seats are small rooms, laboratories, show cases for exhibits, offices, etc. It is located centrally to the beef and dairy barns. The beef barn is new and is located across the road from the dairy barns. The beef and dairy herds and pastures have been enlarged considerably.

A good many of our old professors are still here in spite of constant offers from elsewhere. The faculty has been improved and somewhat stabilized with increased state appropriations.

You know that student body growth a few years after we were graduated created such a pressure that a new dormitory center was established just east of Long Hall, and the President's home was moved up on Hotel Hill. It's still south of the highway; though, the traffic now flowing over the new highway built north of Hotel Hill to allow Bowman Field to be enlarged. All 1800 aggies of the total 6500 enrollment are now living on ag campus. The campus is beautifully landscaped, and the most modern city planning methods have been employed in laying out the walks, lanes, drives, and parking areas. Several new agricultural science buildings are now in the vicinity of the old hospital, which was replaced six years ago with the new one just behind the old Dairy Building.

During the past four days the annual Agricultural Fair has been in progress. In the six years past it has been customary to hold it in the fall in the field house, and it has been called the Fall Festival. This year it was delayed so that dedication ceremonies for the new Agricultural Center could be used to start the ball rolling. For the four days thus far the aggies have really outdone themselves, attendance having been estimated at twenty thousand, not including students. They expect to close tomorrow. I must say it's been an educational show of which any state would be proud. It was tomorrow today.

I guess that's most of what's going on around here. How's your nursery business thriving now? I'll be at home when you write.

The Ole Lady

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ANDERSON, S. C.

## THE DAIRY DEPARTMENT

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Of The Cadet Corps



128,000 Ice Cream Cones Were

Sold in 1938



# DID YOU KNOW?

By E. C. STRUGIS, '39

That the Horned Toad is not really a toad but a lizard?

That the Flying Fish does not fly after leaving the water but glides? This fish swims swiftly to the surface of the water and pushes itself out of the water by means of a fin located on the tail. They may glide from fifty to one hundred feet in the air before going back into the water.

That the Porcupine never shoots its quills? The quills are loosely attached to the Porcupine, but are never "shot" at an intruder.

That the flat tail of a Beaver is not used to dig mud nor as a trowel, but serves as a propeller in swimming?

That with the exception of the Black Widow Spider of the South and Tarantula of the Southwest, Spiders are no more harmful to human beings than are beetles or ants?

That the Bat hangs head downward when at rest?

That feathers are possessed only by Birds?

That the common bathroom sponge is the skeleton of a dead aquatic animal?

That the female Mosquito sucks blood but the male thrives on nectar and other plant juices?

That Snakes have no eyelids and hence their eyes are always open; the eyes are covered by a transparent cap?

That the Opossum is the only animal living in North America that carries its young in a pouch?

That Bats are the only mammals capable of true flight? Other mammals may glide through the air for a short distance, like the Flying Squirrel, but never really fly.

That the Kodiak Bear reaches a weight of fifteen hundred pounds and is the largest Flesh Eating Animal in the world?

That Snakes do not chew their food, but swallow it whole?

That the Koala Bear is not a bear but a pouched animal nearly related to the Opossum and Kangaroo?

That the Leathery Turtle has been known to reach a length of eight feet and a weight of one thousand five hundred pounds?

That the annual damage to our health, our houses and our crops, caused by insects in the United States, is not less than two billion, two hundred thousand dollars?

That over one hundred million pounds of insecticides are now used yearly in an effort to control insects?

That the life of an adult May Fly lasts about twenty four hours? The nymph, or young, live for a period of from two to three years at the bottom of ponds and streams.

That a single Oyster may deposit as many as sixty million eggs in a single season? That is probably what keeps them from becoming extinct.

That the Gila Monster is the only poisonous lizard living in the United States and one of the two poisonous lizards in the world?

That the head of the Bald Eagle is not bald but is covered with white feathers? The neck and tail are also white.

That the White Grub is capable of harboring the thorn headed worm, a parasite of hogs?

That there is no male White Fringed Beetle, these insects breed parthenogenetically?

That the annual loss of cotton due to the boll-weevil is estimated at from two million to five million bales?

That Snakes do not swallow their young to protect them from danger?

(Continued on page 38)

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# Facts About Our State

THE following figures pertaining to the living conditions of the farm people of South Carolina were furnished by Dr. B. O. Williams, Professor of Rural Sociology and Statistics. These are a few of the figures growing out of an intensive study being made of sociological conditions of South Carolina under the direction of Dr. Williams.

1. The birth rate of South Carolina is exactly twice its death rate. That is, twice as many people are born each year as die that year.

2. In South Carolina 51 per cent of the population is under 21 years of age, 41 per cent is between 20 and 55 years of age, and 8 per cent is 55 years and older.

3. In South Carolina 35 per cent of the farmers are owners of the farms that they cultivate, 34 per cent are renters, that is, they furnish live stock and equipment, 31 per cent are croppers who rent the land but furnish no live stock or equipment. They furnish only labor.

4. In South Carolina 50 per cent of the gainfully employed persons are employed in agriculture. There are 9 counties that have 75 per cent or more of their employed people who are engaged in agriculture. There are 14 counties with less than 50 per cent of their people engaged in agriculture. There are only 2 counties with less than 25 per cent of their people engaged in agriculture.

5. In South Carolina 4 per cent of the farm homes have telephones as compared with 34 per cent of the farm homes of the nation.

6. The farm families of South Carolina average only 8/10 milk cows per family of five.

7. In 1929, the farmers of South Carolina produced 209 eggs per farm person as compared to 1070 per farm person in the United States. The farm families of South Carolina raised 41 chicks per farm family of five as compared to 112 per farm family of five in the United States.

8. In 1929, 10 counties in South Carolina had an average of one pig or less per family of five. The average for the state was 2.6 as compared to 9.6 per farm family of five in the United States.

9. In 1929, the average farmer of South Carolina spent \$4.38 for fertilizer for each acre of crop land. Of the counties, 12 spent more than \$5.00 for fertilizer for each acre of crop land. In the United States, the average farmer spent only \$0.66 per acre of crop land.

10. In South Carolina, 53 per cent of the population live on farms as compared to 25 per cent in the United States.

11. In 1930, the farm land of South Carolina was worth \$285 for each farm person as compared to \$1,158 in the United States.

12. The gross farm income for each farm family of five people in South Carolina was \$770 as compared to \$1,825 for each farm family of five in the United States.

13. In 1930, 11 per cent of the farm tenants of South Carolina were related to their land-lord. In the United States, 19 per cent were related to their landlord.

14. In 1930, there were 9 persons for each 100 acres of total land area of South Carolina as compared to 6 persons for each 100 acres of total land area in the United States.

15. In 1930, 37 per cent of the farms of South Carolina were reported as having automobiles as compared to 58 per cent in the United States.

16. In 1930, there were 5.5 acres of farm land in cultivation for each farm person as compared to 13.7 acres for each farm person in the United States.

17. In 1930, 2 per cent of the South Carolina farms had water piped into the bath room as compared to 8 per cent for the United States.

18. South Carolina produced 16 tons of hay for each 100 persons in the farm population in 1929, as compared to 283 tons for each 100 persons in the farm population of the United States.

19. In 1930, 18 per cent of the farm population 10 years of age and older in South Carolina was illiterate as compared to 7 per cent for the U. S.

20. The average value of farmers' dwellings per farm in South Carolina in 1930 was \$560 as compared to \$1126 for each farm dwelling in the United States.

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# AGRARIAN STAFF PERSONALITIES

H. L. Beach—

*"Buck" Beach, Editor-in-chief "The Agrarian" . . . Sec'y-Treas. Blue Key . . . President Alpha Tau Alpha . . . Sigma Epsilon . . . President 4H Club . . . Senior "Taps" Staff . . . President "The Colletonians" . . . Master The Grange . . . F. F. A. Chapter . . . Who's Who Among Student's in American Colleges and Universities . . . Tri-state Intercollegiate Conference . . . Cadet Lt. Colonel . . . Works late . . . Smokes a pipe . . . Likes horse-back riding . . . Attempts to write short stories . . . Plays tennis . . . Reads Liberty . . . Likes non-fiction . . . Writes articles for agricultural magazines and papers . . . Dis-likes "jitterbugging."*



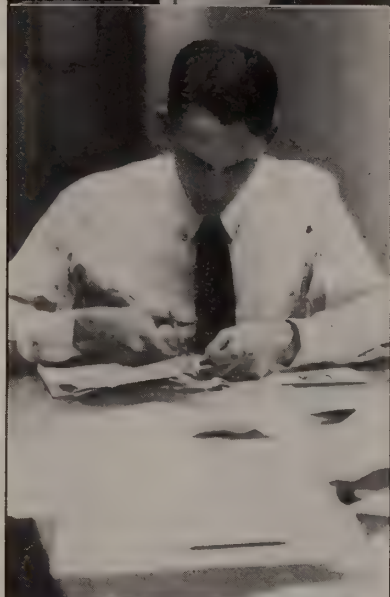
T. B. Young—

*"TB" Young, Managing editor of "The Agrarian" . . . Chronicler Alpha Zeta . . . President Federation of Social Science Clubs of South Carolina Colleges . . . Gamma Alpha Mu . . . Minor Block "C" . . . Cadet Staff Lt. . . Captain Swimming Team . . . Former News Editor "The Tiger" . . . Serious minded . . . Likes to sleep . . . Dislikes noises . . . Likes Archery . . . Reads "Life" . . . Dislikes "Jitterbugging."*



L. M. Rhodes—

*"Bo-rat" Rhodes, Dairy Departmental Editor of "The Agrarian" . . . President Dairy Club . . . Danforth Fellowship awardee . . . Band . . . Is to work in Borden's "Dairy World of Tomorrow" New York World's Fair Exhibit . . . Former "Tiger" man . . . Keen Observer . . . Likes symphonic music . . . Fond of Government . . . Lazy . . . Plays Tennis . . . Ping pong . . . Likes swimming . . . Likes to write . . . Reads "Newsweek" . . . Pet hate is "hot swing."*





## *The South Carolina Tax System*

The system of taxation in South Carolina is subject to much criticism, some of which is just and much of which is unjust. Any tax system will be objectionable to certain groups of people and industries, but there are certain changes in the S. C. system which could be made to the advantage of a large percentage of our population.

The system of taxation in S. C. is certainly not based on ability to pay, nor does it have equality. The general property tax, which provides more than forty per cent of the total revenue, has certain defects such as unequal assessment, failure to tax personal property, double taxing, and often dishonest administration which makes it very unsatisfactory. In addition, this tax rests heaviest on real estate property owners, of whom the farmers are the most important, but have nearly the lowest average annual income. This is not according to the principle of ability to pay, as set forth by Adam Smith in his famous book, "Wealth of Nations."

Dr. G. H. Aull, head of the Agricultural Economics department at Clemson College has formulated several recommendations to improve the tax system.

Based upon careful study and long experience in the field of Public Finance, the following suggestions are made as pointing the way to a better understanding of our tax problems and to an improvement in our tax system.

(1) A thorough study of the whole tax system in South Carolina, with comparisons, to show not only the effects of our taxation system upon our own citizens, but the effects upon the probable future development of the state and its industries.

(2) Statewide assessment and equalization of all property at its actual value by full-time scientifically trained, non-political employees, with a constitutional amendment to permit graduated taxes on different kinds and classes of property.

(3) There should be a periodic registration of all persons of taxpaying age (male and female) and a registration fee substituted for the present poll tax.

(4) There should be a dignified, simplified and coordinated system of making tax returns and collecting tax revenues in South Carolina. One return at one place and for all forms of taxation should be sufficient for each individual or corporation.

(5) Lowered exemptions and credits for dependents under the provisions of our present income tax would reach a larger number of taxpayers and materially increase the revenue to the state to

be paid by those with incomes, which would permit a reduction in the taxes to be paid by those who own property.

(6) Further encouragement of the proposal for federal aid to education without, of course, federal control. In this connection a statewide system for raising all the revenue needed to finance the elementary and high schools of the state would equalize both opportunities and burdens and seems to be the fair thing to do.

(7) A determined effort should be made to collect delinquent property taxes now long over-due. This is essential not only to maintain our system of government but also in justice to the mass of citizens who have already paid taxes, frequently at considerable sacrifice. In cases where the collection of property taxes would obviously impose an excessive burden upon the taxpayer, provisions might be made out of other funds for relief. However, in those cases where the assessment is fair, and the levy uniformly applied, the continuance of the system of taxing property is dependent on the fearless and unvarying enforcement of the law.

(8) Installment payment of all taxes would be helpful.

(9) Until public officials take a more active part in enrolling the taxpayer and making him conscious of the responsibilities of citizenship, it is not likely that there will be any improvement in the percentage of people participating in various duties of citizenship. Citizens now take too little interest in public affairs. There should be one day set aside in each year as a "citizenship day" during which, in various assemblies, those individuals who have become of age during the year could be instructed in the duties and responsibilities which they inherit as such.

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# MOSQUITOES

By F. T. ARNOLD, JR.

Most of us need no introduction to these small, but vicious insects. The most common of these is the house mosquito, which can be found around practically all of our houses. So far as is known, this mosquito does not transmit malaria or yellow fever to human beings. It is important to us because of the great annoyance it affords.

The mosquito is not particular where it breeds. It may be found in tin cans, rain barrels, quiet pools, ditches, hollow stumps, watering troughs and many other similar places. It is commonly thought that they breed in weeds and wet grasses, but this is incorrect. Mosquitoes hide in tall grasses and on passing through the weeds, one gets the impression that it is their breeding place. In order for a mosquito egg to hatch and develop into an adult it must remain in water from eight to ten days. Mosquitoes, as a rule, prefer standing water, and are seldom found in running streams. The running water seems to interfere with the breathing and feeding of the larva. These larvae are often called "wiggle tails". The "wiggle tails" rest with the tip of their abdomen at the surface of the water. They pierce the surface film with a small air tube that projects from their abdomen, and is their only means of securing air for carrying on respiration.

The eggs of the house mosquito are laid in small rafts. Each raft contains from one hundred to two hundred eggs. The eggs stand on end in regular rows, with the larger end down. These eggs may hatch in several days or as short a time as twenty-four hours, depending on the temperature.

The larvae or "wiggle tails" feeds on microscopic animals and plants. They may become cannibalistic when food is scarce.

Experiments have shown that the average hatching percentage of eggs is from 80 to 90 per cent. In other words 80 to 90 out of every 100 eggs hatch. Of course this does not mean that 80 to 90 out of every 100 become adults. It was also found that the mortality of the larvae ranged from 5 to 20 per cent. Under normal conditions these figures might run higher. Fish feed on "wiggle tails" readily, and many other factors help to reduce the number of larvae in their natural habitat. Another point that should be brought in is; out of all the larvae that develop into adults, it has been found that the number of males run higher than the females. The male mosquitoes do not bite or annoy us in any way. They feed mainly on fruit juices and the

nectar of flowers. The male can be distinguished easily by the plume on the head. As a rule the house mosquitoes do not fly very far from their breeding places, the average flight being from 200 to 400 yards.

## *The Malaria Mosquito*

There are several species of mosquitoes in the U. S. that have been proven to carry malaria. The life history of these is similar to that of the house mosquito, however, the malaria mosquitoes lay their eggs singly, and at random on the surface of the water. The shape of the eggs is different also, resembling a canoe when seen from the side. The eggs of the malaria mosquito may be deposited in small running streams or branches. Another big difference is in the larva or "wiggle tail." As was pointed out before, the larvae of the house mosquito hang from the surface of the water, with the head downward. The larvae of the malaria mosquito lie in a horizontal position at the surface. The malaria mosquitoes take a little longer to develop into adults, from 16 to 20 days. However, this seems only a short time. At this rate there can be developed a new lot about every 16 days, and it also indicates how some method of control should be used. The malaria mosquito does not breed in barrels, cans, etc., as the house mosquito, but prefers ditches, shallow streams and pools.

## *Methods of Control*

Drainage is an effective method of control. Emptying all buckets, tanks, barrels, that are not in use will aid in their control. Old automobile tires are favorite breeding places also. These old tires should be destroyed or kept in a dry place.

Drainage is one of the most desirable and most effective methods of control. In case of pools or bodies of water that cannot be drained, and pools for ornamental purposes that cannot be treated with oil, fish may be used. Not all fish make good mosquito destroyers. A fish, in order to be effective in control of mosquitoes, must have the following characteristics. It must be a small fish so that it can reach the shallow portions of the pool. It must be a top feeder, a feeder on mosquito larva, and a prolific breeder. The gold fish is a desirable species for introduction to small pools. This fish is used in Japan mainly for the control of mosquitoes.

The Top minnow (*Gambusia* sp.) perhaps meets

(Continued on page 34)



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We have recently engaged Mr. Walter W. Dillard of Greer, S. C., a Clemson College Graduate in Horticulture, as our field representative for the Carolinas. Mr. Dillard will be glad to discuss with you at any time the composition of our various products and their applicability to your problems.

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First at Clemson College 3 year average 1936-38

First at Clemson College 9 year average 1929-38

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First in 33 tests in Piedmont Section of N. C. 1937

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## SEEDLAND FARMS

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# Better Performance of Farm Machinery

By H. K. HERLONG, '39

Millions of dollars worth of farm machinery is sold as scrap iron each year, and millions more are spent for unnecessary repairs. This money is entered on the farm account book as "depreciation", and rightly so, since machinery is not designed or expected to last forever. But this figure can be surprisingly decreased, if a little care and mechanical knowledge is put into practice. First and foremost in overcoming this situation, one should read the instruction book which is furnished with each piece of equipment, until he has a thorough understanding of exactly what he has bought and what he can expect of it. Then he should learn the part of the instruction book concerning the care and operation, and after reaching complete understanding he should be sure to comply with every detail. This information has been compiled from experiments and tests over a period of years, and is the most authentic instruction available. Still a great many farmers ignore it completely.

It is evident that a knowledge of the operation,

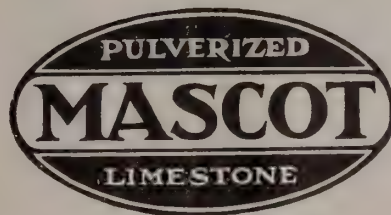
care, and repair of farm machinery becomes increasingly important with the steady growth in the use of farm implements. Therefore the farmer of today must possess a great deal of mechanical knowledge as well as a general farming knowledge.

The general purpose tractor will serve as a good illustration of a typical farm implement. It is composed of five main units—the fuel, ignition, oiling, cooling, and transmission systems. Each of these are dependent upon one another, and one cannot function properly without the cooperation of the other four. Therefore in order to obtain best results, all units must be properly cared for and properly adjusted.

When a new machine is delivered it is usually properly adjusted and ready for service. All the operator has to do is to insure correct lubrication and proper care, but when trouble arises, he should be able to analyze his machine and correct the cause of his difficulty.

(Continued on page 34)

## "IT'S A DOLOMITE"



Supplies magnesium of recognized value

## American Limestone Company

Knoxville, Tennessee



## MOSQUITOES

(Continued from page 31)

the requirements more nearly than any other species. It is capable of adapting itself to almost every climatic condition.

The use of an oil film on the infested water is one of the most widely used remedies of today.

A question that is often asked is; how does oil kill mosquitoes? If oil is poured upon the water, it readily spreads in a thin film over the entire body. This film has a comparatively strong tension, and it is very hard for an insect to break it. The larva and pupa breathe through air tubes, as has already been shown. It is impossible for them to thrust the air tube through the oil at the surface of the water, and in a short time they suffocate. The oil also produces an injury when it comes in contact with the air tube and therefore hastens death.

Kerosene oil seems to be the ideal oil to use. It is light and, therefore, spreads over the surface of the water rapidly. For bodies of water that have no currents, heavy oil may be more suitable because it does not evaporate so readily.

The oil may be applied as a spray in case of small pools and ditches.

It may also be applied to barrels and similar containers by pouring it into the container. Ex-

periments have shown that a half teaspoon full of kerosene to a barrel is sufficient to kill mosquitoes.

## BETTER PERFORMANCE OF FARM MACHINERY

(Continued from page 33)

The tractor, like all other machines, is very responsive to careful handling. It should be needless to say that any farm implement lasts longer, does better work, and does it at a lower cost when given the best care. Another true assumption is that the operator who gives more than the usual attention to proper oiling and cooling of his power implements will be more than repaid in better performance.

## WHAT IS COTTON?

(Continued from page 17)

*Communism*: If you have 2 cows, you give them to the government, and the government gives you some of the milk.

*Fascism*: If you have 2 cows, you keep the cows and give the milk to the government, and the government then sells you some of the milk.

*New Dealism*: If you have 2 cows, you shoot one and milk the other, and pour the milk down the sink.



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## POWER MACHINERY IN THE SOUTH

(Continued from page 5)

base of sixty-one inches, and overall width of forty-nine inches, and weighs approximately sixteen hundred and thirty pounds.

The other company has a small tractor and accessories which seems to fit the needs of the small farmer in every respect. This tractor is capable of drawing a single bottom sixteen inch moldboard plow or two disk plows. This tractor sells for only four hundred and ninety-five dollars. This same company has also designed a three and a half foot all crop harvester for this tractor, and it sells for three hundred and forty-five dollars. The tractor, single bottom moldboard plow, single bottom disk plow, and the all crop harvester are sold for one thousand dollars.

Certainly these are the best offers which have ever been made to the South, and the low priced equipment makes it possible for many farmers to use labor saving power devices and use them economically.

It must be left to the good judgment of each individual farmer as to what size tractor and the number and kind of implements he will need for his farm. There are many tasks which cannot be done with machinery, which must be done with animal power. Honest farm implement dealers will not sell useless and wasteful machinery to farmers to do these tasks, for the results are not only detrimental to the farmer but also to the farm machinery dealer.

Perhaps it will be many years before the southern agriculturalists learn what machines may be efficiently used on their farms, but when the point is reached where animal power and machinery can both be used economically, the South will begin to realize larger profits from its greatest industry—farming.

## GROWTH PROMOTING SUBSTANCES

(Continued from page 22)

*Treatment is Economical*

To the commercial grower these substances offer economy in cost per rooted cutting, and saves time, labor, and space in the cutting bench.

To the non-commercial grower they offer opportunity for increasing gardening pleasure with more satisfying results.

Another possible use of these growth promoting substances is the production of seedless fruit. Spraying these substances into unpollinated flowers of tomato, holly, and other plants has induced the development of the fruit. For example, holly pro-

duces pistillate (female) and staminate (male) flowers on separate trees. As you know, pollen from the staminate (male) tree is necessary to fertilize the flowers of the female trees. After pollination takes place the berries on the female tree begin to develop. The spraying of growth promoting substances on unpollinated female flowers has stimulated the development of the berries. So far the production of seedless fruit by spraying growth promoting substances onto unpollinated female flowers has been demonstrated only in a scientist's greenhouse. Commercial application of this discovery depends upon finding ways of treating large numbers of flowers economically.

Some unusual experiments with these growth promoting substances have produced roots growing from leaves, stems and even petals of flowers, forming "plants with whiskers".

Jack's beanstalk, that climbed to the clouds in a single night, must have had a good dose of these growth promoting substances.

The whole subject of plant hormones is new. It would be rash to prophesy what may happen; yet it would be even more rash to declare anything impossible.





## REGIONAL VEGETABLE BREEDING FOR THE SOUTHEAST

(Continued from page 19)

addition to furnishing material to other experiment stations, the Regional Vegetable Breeding Laboratory is carrying on much fundamental research, especially in plant genetics, to facilitate the carrying out of a practical breeding program. On certain crops some of the state workers have well-developed material which they have very generously offered to share with the Regional Vegetable Breeding Laboratory. Such complete co-operation from both sides may truly convert the attack on southern vegetable problems into a broad regional attack, and it is believed that a well co-ordinated research program for the whole region will secure the desired objective of better vegetables for the South. It is fully realized, of course, that many requirements in the area can best be met by varieties of very limited adaptability, especially suited to certain localities. If hardy, disease-resistant parents or hybrid material is made available by the Laboratory to the workers in various places; however, they can more readily undertake work in the breeding of strains with special adaptability.

### *Crops*

At the present time breeding work is under way with the following crops:

#### *Snapbeans*

The object is to produce snapbean varieties resistant to the common and halo bacterial blights; preliminary tests for resistance to various other diseases are also being conducted.

#### *Tomatoes*

This crop is important in the south both for shipping and canning. One of the most serious problems has been high cost of production due mostly to small yields and short fruiting seasons. If hardy strains relatively tolerant to leaf-destroying diseases and sunburn can be developed, then yields will be greatly increased and the fruiting seasons very much lengthened.

#### *Cabbage*

The entire southeastern region is interested in cabbage production, both for local marketing, gardening and shipping. All sections need varieties which combine cold hardiness, tight, round heads, freedom from premature seeding, and tolerance of or resistance to the more common diseases. It is planned to accomplish these objectives by selecting successful crosses of pure line breeding stock.

#### *Watermelons*

The outstanding work being done on watermelons is studies concerning inheritance of such important characters as seed size and color, skin,

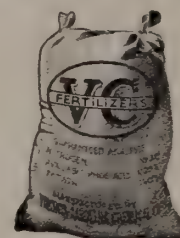
color, flesh color, sugar content, and fruit shape and size.

Work is also being done on varieties resistant to anthracnose and wilt.

#### *Sweet Corn*

The corn earworm prefers sweet corn to all other crops, but in its absence eats nearly any other plant which is at hand. In the South, dent (field) corn is one crop that the earworm does not bother. Hybrids between sweet and dent corn, and many inbred lines established from such hybrids, as well as the original varieties, have shown promise of earworm resistance.

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## AGRICULTURE AND CHEMISTRY

(Continued from page 16)

so hard that they are almost brick-like. Even the stalks are finding uses and eager experimenters are searching for more. That the South is too dependent on cotton and similar staple crops may be the answer flung at the above, but the chemist has anticipated it and has the second of his science's functions as an answer to any possible criticism. Everywhere the chemist is developing new industrial processes that require for their raw materials new types of crops. The relatively new Tung oil industry is creating a new paying crop in the Tung tree. The production of paper from pine pulp has offered the South a new crop with which to plant its fields; one that will serve as an aid to the engineer who is trying to solve the weighty problem of erosion. Who knows, the production of such a thing as a synthetic rubber may someday make one of our weeds of today one of the most valuable crops of tomorrow.

Then too, the chemist is interested in what may at first seem to be almost a strictly theoretical portion of the science of growing things, i. e., technical studies of the actual mechanics of what goes on down in the soil. The knowledge of colloid chemistry, of physical chemistry, of organic chemistry, of analytical chemistry, and general inorganic chemistry are combined in the efforts to solve the problems that arise in the search for the explanation of the phenomena that are occurring in the soil itself. More accurate information as to the requirements for the best fertilizers and such things as the so called liquid farming are some of the results. In the latter no soil is used at all, the seeds being usually sown on some porous or semi-porous membrane suspended just below the surface of a solution containing those chemicals necessary for the proper growth of the plant. This system is out of the experimental stage, for in many cases it is used to advantage commercially.

From any viewpoint it is obvious to the observer that chemistry and agriculture, like many other sciences, of to day, are so interrelated that it is at times difficult to know where one ceases and the other takes over.

## TULAREMIA

(Continued from page 18)

This ulcer is very slow to heal and does not respond to ordinary methods of treatment.

The disease usually lasts from two to three weeks, during which time there occurs repeated chills and sweats, with marked weakness, prostration, and loss of weight. The fever range is from 102 to 105 degrees.

One of the most serious features of the disease is the slow convalescence. Complete recovery may take as long as six months and some persons have been incapacitated for as long as a year.

The death rate is about five per cent and observations have shown that persons having heart ailments or older people succumb more readily than younger ones.

Prevention of this serious disease may be accomplished by thorough cooking of rabbits as it may be contracted by eating the meat near the bones that has not been cooked as thoroughly as the outer portions. All persons who handle wild rabbits should wear rubber gloves as the usual means of entrance is through a small cut or scratch on the hands. Special care should be taken not to use the meat of a rabbit that seemed sluggish or ill. Persons who are in the woods a great deal should be careful to remove ticks from their legs and should look over the pelts of domestic animals for attached ticks.

There is no specific treatment for this disease and medicines used are for the reduction of pain and fever. Therefore preventive measures are the best defense.

Twenty-five members of the teaching, research, and extension staffs attended the meeting of the association of Southern Agricultural Workers held at New Orleans on February the first, second, and third. Dean H. P. Cooper, the retiring president of the association, delivered his presidential address on Wednesday the first at the annual banquet attended by approximately seven hundred people representing thirteen southeastern states. On Thursday noon, some fifty Clemson men attended a luncheon at which Honorable Edgar A. Brown, member of the board of trustees, made a short speech. Among the other interesting events of especial interest to Clemsonians was the address in which the Honorable A. Frank Lever, member of the board of trustees of Clemson, expressed tokens of appreciation to the seven men, among whom was the late Dr. David R. Coker, associated with the association since its organization.

## FOR FINE FRUIT TREES

and ornamental plants write to

## FRUITLAND NURSERIES

'The South's Oldest'

Augusta, Ga.



## The Place of the Agriculture Teacher in Community Life

By ROGERS TOWNSEND, '39

We often soliloquize to ourselves that an Agriculture teacher must be "A Jack of All Trades". In reminiscing articles that I have read published by different Agriculture teachers, I would definitely say that the soliloquy is aptly true.

Among some of the interesting things that a teacher does in addition to holding all day, part time, and evening classes, is to make survey after survey of the community in which he is working; become a friend of every farmer and his family, constantly studying their problems; and take an active part in all activities of the community such as Church work, sponsoring various socials, etc.

I have noticed where one teacher sponsored a recreation program for his part time boys. Another sponsored a short course for farm women in which they were taught different farm jobs that might be done by ladies, and thereby allow them to be of great aid to their husbands on the farm. Still another taught a class of girls the value of home beautification. Then there was a teacher who sponsored F. F. A. activities, while another in a far section of the country was busily engaged in sponsoring a butchering and meat cutting bee, at which both men and women were taught to make different cuts of beef and the art of purchasing choice cheap cuts. Yet another found the necessity of turning lawyer—at least long enough to teach a class in farm law.

So, we see that the Agriculture teacher really is "A Jack of All Trades"—but, let me emphasize the activity that an Agriculture teacher takes in certain small forms of entertainment. I have known them to play the leading rolls in benefit playlets, become the leader of the Grange and other organizations, also take part in the successful programs sponsored by the 4-H Club, as well as play an important part in the life of the boys during the summer by carrying them on various trips all over the State.

The Agriculture teacher has a decided advantage over the other teachers in the community in that he has the chance to visit the various homes and study the home conditions. It is with the knowledge of these conditions that they often become the best Sunday School teacher and worker in the community.

### DID YOU KNOW?

(Continued from page 27)

That Shark Oil is used in Japan as a lubricant in airplane motors?

That all Snakes can swim and some of them can remain under water for several hours without drowning?

That the eggs of the Corn-Root Aphid are collected by Ants in the autumn and stored in their underground nests, where they are cared for until spring, when the newly hatched Aphids are carried to the roots of corn?

That it is estimated that insects destroy one-tenth of everything man grows?

That male kangaroos keep on growing as long as they live?

That fragile looking butterflies called "Painted Ladies" fly all the way to England from North Africa, over a thousand miles?

That a sperm whale can eat a ton of food a day?

That salamanders, frogs, and toads will dry up and die unless their skins are kept moist?

That a land snail moves at a speed of about a mile a month?

That new-born opossums are no bigger than bumblebees?

That the chameleon's tongue can be extended longer than the animal's whole body?

That eggs of the sea shrimp are so tiny that twenty-four of them could rest on a pin head?

That a rattlesnake does not always sound its rattle before striking?

That a baby rattlesnake has no rattle—but has the "button" for a start.

### CLEMSON COLLEGE ROAD-SIDE MARKET

Open April 15th to December 15th

We sell 115 varieties of peaches, 75 varieties of apples, and many varieties of grapes, plums, cherries, raspberries, dewberries, pecans, etc. Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

The Horticultural Department, C. A. C.





# Gold--At the End of the Rainbow

By JOE F. STRIBLING

**H**AVE you an undeveloped gold mine on your property? Have you ever thought of the possibilities of electric power from that idle stream that runs through your place? I did not, until I saw a striking rainbow formed by the splashing water from an old mill race. I thought of an inexpensive plan by which I could change this natural energy into electric power for use in our home.

Water is one of the cheapest sources of power known to man today. To transform this energy into electric power is not a very complicated problem, and it is not an expensive one, considering the savings and conveniences derived from it. Rural electrification is a big help toward better and more comfortable living conditions on the farm. However, the advantages of electricity are too numerous to mention here.

The picture that accompanies this article will illustrate the simple, inexpensive, efficient plant that I recently installed at my home. A section of

the old mill race was sawed out and a concrete foundation for the wheel was built on solid rock. The overshot water wheel was installed under the race. A cast iron external spur gear was fastened to the water wheel shaft. This gear meshes with a pinion gear on a speed shaft. A 12 inch fiat face pulley was used on this speed shaft and was belted to the generator with two Ford V8 fan belts. The speed ratio from the wheel to the generator is 50 to 1. I intend to use an 18 inch pulley in the place of the 12 inch one to increase the speed ratio to 75 to 1.

The framework for this water wheel is an old belt pulley which is 7 feet in diameter and has a 17 inch face. The rim and buckets were cut from 16 guage sheet steel and put together in sections with small machine bolts. The wheel was mounted on two, double roller, ball bearings taken from the rear wheels of an old Buick. This wheel will develop approximately two horsepower. The cost was about \$75 and 20 days in labor. I used an old Delco generator that I had on hand, and some second hand wire to

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carry the power to the house, a distance of about five hundred feet.

As a word of warning I would like to advise anyone who is interested in installing a plant of this type to be sure that he has a sufficient water supply and adequate fall. I am using about 50 cubic feet of water per minute, which will supply power for eight 50 watt lamps. Personally, I feel that an efficient outfit like this is worth all that it cost. The maintenance expense for a wheel of this type is very small.

I shall be glad to give any further information that I can to anyone who is interested in installing a plant of this kind.

#### VENERABLE LEADERS OF THE SOUTH

(Continued from page 3)

fertilizers, he made this interesting statement, "There can be no civilization without population, no population without food, and no food without phosphoric acid." As fervently as Calhoun worked for the South, so did Clemson work for the founding of an agricultural college in South Carolina. Although he did not live to see the college, it stands today as a great monument to his effort, for when he died he left his property and most of his fortune for the founding of an agricultural college at Fort Hill.

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VOL. I



No. 3

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## The Agricultural Society of South Carolina

..... the oldest agricultural society in the United States, organized in Charleston in 1785 and since then a big factor in the advancement of agriculture locally and over the state; membership history shows many prominent figures.

By THOMAS B. YOUNG, Jr., '39

**T**he *State Gazette of South Carolina*, August 29, 1785, contains the following notice: "On Wednesday, the 24th inst., a number of gentlemen met at the City Hall for the purpose of forming a Society in this State to encourage Agriculture, according to the resolves of the meeting on the 9th inst.; when the committee at that time appointed made a report; after which the gentlemen formed themselves into a Society under the Style and title of *The South Carolina Society for Promoting and Improving Agriculture, and Other Rural Concerns*; and proceeded to the election of officers, when the following were appointed: The Honourable - Thomas Heyward, Jun., Esq., President; Thomas Pinckney, Esq., Vice-President, and Peter Bonnetheau, Esq., Secretary." Thomas Heyward made an address, and rules were adopted for the government of the Society. The address and rules appeared in the *Charleston Gazette* on that same date.

This was the beginning of the first and one of the most famous agricultural societies in the United States. Since this date this agricultural society has been endeavoring to do just what its title plainly

says: "promoting and improving agriculture, and other rural concerns." Its members, energetic and resourceful leaders, many of them famous in the history of our state, have for 153 years been bettering agriculture in South Carolina both as a society and as individual agriculturists.

The names of some of the early members are familiar to even those very casually acquainted with South Carolina history, including John Rutledge, Thomas Pinckney, Gen. Charles Cotesworth Pinckney, Thomas Heyward, and Edward Rutledge. The name of the Society was changed by the Act of Incorporation, passed by the Legislature, Dec. 19, 1795, to its present name, *The Agricultural Society of South Carolina*; however, it is often referred to as the Charleston Agricultural Society. Its membership is drawn mostly from the Charleston area and its greatest activity has been in that area.

Through an earnest endeavor of the Society in its early days, plants and seed were imported from all sections of the world for experimental purposes. The following quotation from the minutes of the

(Continued on page 30)





Rotherwood Farm

## Rotherwood Farm

*..... a model demonstration dairy farm. Its owner a powerful influence on Southern agriculture and the farm one of the foremost in the Southeast. ....*

By JAMES E. BLESSING, '41

**R**OTHERWOOD farm, located in the valley of East Tennessee, is widely known throughout the United States for the development of some of the South's greatest Jersey herds. The 2,300 acre farm is located on the banks of the Holston river just outside Kingsport, a busy industrial center. The Old Rotherwood home, which overlooks the river, and historical Old Fort Robinson (erected in 1761) is a welcoming spot for everyone who visits there. For many years Rotherwood has been recognized as a leading farm, and it is now hailed as one of the foremost dairy farms in the southeast.

It is a model demonstration farm and is owned by Mr. John B. Dennis, who has been a powerful influence in developing Southern agriculture. At all times Mr. Dennis extends a hearty welcome to those who wish to visit the farm and see the development which it is carrying on. The manager cooperates with educational institutions in giving their students a broader knowledge of Southern agriculture and dairy herd improvements. The Rotherwood farm is known as a meeting place for judging teams from all counties in Tennessee and neighboring states, and students of the University of Tennessee receive practical experience in milk testing and herd management under the supervision of Mr. LaFever, the manager of the dairy herd.

The Rotherwood herd, which has carried its fame into all sections of this country and as far as Costa Rica, was started in the fall of 1927. Forty

cows, representing the best blood lines of the Island of Jersey, were imported along with one herd sire, Boutilliere's Brampton Lad 279978, prize winning son of Bowlina's Oxford Sultan 254623. Now mostly home-bred, the herd has maintained the uniformity in type that prevailed in the original herd. Two-thirds of the entire herd carry the blood of LaFosse Golden Beauty, who recently died in her 17th year. Her progeny have been outstanding in both show ring and production circles.

The present herd, numbering eighty-five, is headed by Boutilliere's Ivanhoe, Silver Medal Tested Superior Sire (332786) son of Boutilliere's Brampton Lad, Gold and Silver Medal Tested Sire, and out of LaFosse Golden Beauty 772539, Gold Medal Tested Dam. He was the first Jersey bull in the South to become a Superior Sire, bred and developed by the same owner. Among the noted members of the herd are the five daughters of LaFosse Golden Beauty and the daughters of one of her son's. These have produced an average of 645.55 lbs. butterfat; 11,795 lbs. milk; av. per cent 5.47. Boutilliere's Ivanhoe has nineteen daughters officially tested with an average of 603.81 lbs. butterfat; 10,674 lbs. milk; 5.66 per cent fat on a mature yearly basis. Out of twelve daughters officially classified, four rated "Very Good" and eight "Good Plus."

Design's Brampton Noble 318955 Silver Medal herd Sire, Son of Design's Fern Oxford 287623 and

(Continued on page 31)



# A Touch of Clemson Community History

..... once big Indian settlement, Pendleton later important government seat, low country planters had summer homes over here, old Stone Church Cemetery veritable Westminster Abbey of upper S. C.

R. L. ARIAIL, '40

**A**MID the hustle and bustle of the every day campus activity, or amid the excitement and applause of a full dress parade or football game, the average visitor seldom stops to think or inquire about the history and points of historical interest of Clemson and surrounding community. As a matter of fact, this community can boast of a past history that is unequalled by most up state communities.

Even before the coming of the white man, this section was a center of activity, for located at the foot of a high bluff on the college farm is the site of the Indian Village, Essenecca. This village was the southernmost of the larger villages of the great Cherokee domain, which stretched northward across the Blue Ridge. At the top of this same bluff Fort Rutledge was erected in 1776 by General Andrew Williamson. The approximate location of the fort is marked by a small concrete replica and bronze tablet.

The nearby town of Pendleton was for many years the most important seat of local government in northwestern South Carolina. It had its beginning in 1790, when the commissioners provided by the act of 1789 to select a seat of government for Pendleton County, selected the site of the present town. In Pendleton we find the Pendleton Farmers Society hall, the oldest in the United States. It was while Thomas G. Clemson was president of the society that a movement was begun for the founding of Clemson College. In the cemetery of St. Paul's Episcopal, an old church of the village, Thomas G. Clemson and his wife Anna Calhoun Clemson are buried. Here also is buried General Barnard E. Bee, who gave General Jackson his sobriquet, Stonewall, at the battle of Manassas.

Many low country planters had summer homes in and near Pendleton. Among the old homes still standing are Altamont and Woodburn, homes of the Pinckneys; Astabula, home of the Gibbs and Lattas; Boscobel, home of the Prioleaus and Adjers and Micassa, home of the Stewarts and Calhouns.

Of all these and many other interesting points, probably the most interesting is the Old Stone Church and cemetery, located on a country road about three miles south of Clemson College. The church organization, known as Hopewell on Keowee

and dating from 1785, first occupied a log building but later built the present stone structure in 1797. This was one of the first Presbyterian churches in upper South Carolina, and was the parent of the present Presbyterian Church of Pendleton.

In the cemetery is the grave of John Miller, better known as Printer John Miller to distinguish him from his son and grandson whose names were also John. Printer John Miller was a native of London, England, where he was one of the owners of the *London Evening Post*. He dared to defy the officers of George III and published articles held libelous by English courts. After suffering imprisonment he became disgusted and left his native shores in 1782. He first migrated to Philadelphia and later moved to Charleston, where he published the *South Carolina Gazette and General Advertiser*, one of the first papers in South Carolina. After receiving a grant of six hundred and forty acres on Eighteen Mile Creek, he sold the Charleston paper and removed to Pendleton, where he established *Miller's Weekly*, later known as *The Pendleton Messenger*, one of the earlier up state papers. It was from this grant that he gave land for the church and cemetery which included about seventeen acres.

Among other interesting men buried in this cemetery are Colonel Robert Anderson, a leader in the Revolutionary war; General Pickens, another Revolutionary leader, and his son, Andrew, Governor of South Carolina during the war of 1812, and Turner Bynum, a brilliant young journalist who was killed in a duel in a Nullification Controversy, in 1832. Also the veterans of four wars rest in the cemetery—the Revolutionary, the War of 1812, the Indian Creek War of 1815-1816, and the War Between the States.

The Old Stone Church and cemetery is administered by a nonsectarian, self-perpetuating commission, and the cemetery is maintained by the income from a small endowment. The upkeep of the church, however, depends at present upon the interest of the public. Surely every Clemson boy and every interested visitor should visit the Old Stone Church and take pride in its upkeep as a monument to those of an earlier date—the founders of our nation.



# MATCHING INDUSTRY'S PROGRESS

By T. S. BUIE

*Regional Conservator, Soil Conservation Service*

ECONOMISTS tell us that the best community is one in which a proper balance is maintained between agriculture and industry. And surely the Piedmont section extending through the Carolinas and Georgia, with its abundant water-power, plentiful rainfall, mild climate, and the adaptability of its soils to a wider diversity of crops, has ideal possibilities for maintaining such a balance.

The Piedmont section from its earliest history has been an agricultural region. But within recent years it has also become highly industrialized. One may travel by train on the Southern Railway or by car on U. S. Highway 29 for several hundred miles without more than momentarily being out of sight of a high smokestack of some mill or factory.

But this same section is noted for the careless manner in which the soil has been treated by its owners. Secretary of Agriculture Wallace has said that farmers of this section have treated their soil with less concern, and have mistreated it more than farmers of almost any other section of the country. This is indeed a severe indictment. But one has only to travel the route mentioned above or fly at a high altitude over any portion of the 40 million acres constituting the Southern Piedmont to realize the accuracy of Secretary Wallace's statement.

An agriculture built around cotton and corn—crops which are planted in April or May and harvested in September or October—does not provide for protection of the land. The soil lies bare for many months, and even the growing of crops affords little protection to the soil, for the method of frequent cultivation appears designed particularly to provide for maximum soil losses. Each succeeding rain exacts its toll of soil especially during the winter months when most fields are bare.

Ever-present rills are an indication of excessive sheet erosion and the beginning of gulying in most fields. Every stage of erosion may be seen within the space of a few miles. Steep hillsides recently cleared, probably not for the first time, nor even the second, are beginning to wash again.

This was not always the picture of the Piedmont section, for the early settlers have left us a record telling of clear streams, dense woods, and a deep, fertile soil. But today we see the landscape dissected by gullies, many of them 40 feet or more in depth and stopped only by having reached a practically

level grade with the stream to which they contribute or the crest of the ridge separating two drainage areas.

A few days ago I stood on the bank of one of these Piedmont streams and saw rush by the muddy water so typical of this section. At first glance what I saw appeared to be merely fine particles of soil being carried along in suspension by the water, and imparting to it a brownish-yellow color. But the swirling water fascinated me. Like the sphere in which a crystal gazer reads the past and future, the stream itself, once crystal clear, seemed to be unfolding before me the very life history of the country.

And indeed, in its real significance, the suspended material in the water was presenting a veritable panorama of past and future events, more real than the fancied images which the crystal gazer sees. For here the fertile topsoil from a thousand fields was being swept ruthlessly to the sea, carrying with it the promise of high yields, profitable crops, a justifiable income, and a living wage for the tiller of the soil. Here in material form were passing the hopes and aspirations of a people for better opportunities for their children.

Intensely human are these hopes: The natural desire of a father for the education of his son or daughter; the hope of cultural advantages which come with better schools, churches, social activities; the hope of some day being able to afford what all of us have come to regard as the necessities of life—the simple luxuries, perhaps an automobile, an opportunity to visit one's relatives, or for the overworked farm wife the hope of water in the kitchen, a new piece of furniture, or a rug to cover the rough floor.

But when are such things to be had, how are they to be afforded if our productive soil continues on its way to the sea without interruption? It is not enough to dismiss such considerations by saying that this is the farmer's worry, that manufacturers and business men are not concerned. Not even industry and business can flourish permanently when their roots are anchored in sterile soil.

For if the farmer cannot produce beyond his bare requirements, how can he buy automobiles, travel by train, pay for transportation of goods produced elsewhere, purchase fertilizer, buy farm im-





A South Carolina farm planned for erosion control: Contour furrowed pasture in the foreground, strip rotations and terraces on cultivated land, orchard trees planted on the contour. (Inset: T. S. Buie, Clemson '17, Director)

plements, obtain furniture, pay taxes to pave roads support schools, build churches, develop rural electric lines, or do any of the other things which our complex civilization requires that he do in bearing his part of the community burden? Finally, families driven by unrestrained erosion from the land where they were once self-supporting must eventually become a burden upon others.

Industrial development, only recently established in this section, was set up in the beginning along modern lines. But agriculture, fettered by the habits of generations past, has sought to solve its problems in an increasingly complex civilization by outmoded methods. While preserving the identity and individuality of the farm unit, we can and must by co-operative action and land-use planning put agriculture on an equal footing with industry and at the same time conserve our basic soil resources.

Let us look for a moment at the organization of industry and compare it with the situation in agriculture. The textile mill as the typical unit of industrial organization in the Southern Piedmont presents a picture of efficiency. Several thousand skilled workers living in a compact mill village perform their daily tasks under the direction of foremen, superintendents, and other supervisors who in turn direct the work in accordance with the policy of the mill executives. Purchases of raw materials are hedged against price fluctuations, production is geared to public demand, and the finished product is sold in the most favorable market. Every man in this smooth-working organization is a specialist in his particular line.

In agriculture, individual ownership of farm land and devotion to our democratic processes preclude the possibility of working out such a system.

For a man's farm is his home, therefore his castle. But compare the efficient organization of industry with the situation in agriculture, where the individual farm is the unit of organization and the individual farmer must necessarily serve in the capacity of buyer, skilled laborer, and salesman of the product of his industry. He is dependent upon the vagaries of the weather, the whims of the market, and the uncertainties of insect damage. To do an effective job even under favorable circumstances he must be a soils specialist, agricultural engineer, agronomist, forester, weather prophet, and market forecaster.

How then can we hope to maintain a balance between agriculture and industry with so many advantages of operation in industry's favor. I think the new approach we are making to the problem through farmer-organized soil conservation districts is the answer to that question. We cannot duplicate the structure of industry, but we can approximate industry's methods in the district program. Under appropriate state legislation, groups of farmers with a community of interests and with related problems are enabled to weld their farm units into an effective organization for carrying out their common aspirations. Their own local representatives—a small body of elected and appointed supervisors—serve as the governing body of the district and determine the land-use program and other objectives.

In this new set-up, the farmer and his government, both federal and local, are partners in a great endeavor to conserve our soil resources and improve our farm living conditions. It is a democratic approach to the solution of the problem for within

(Continued on page 32)



# *The Soil Acidity Problem in South Carolina*

*..... liming and diversification of crops suggested as means of improving agriculture in the one crop, poor farmer South. ....*

By R. L. ARIAIL, '40

IT IS now generally accepted by all that the South is relatively poor in actual wealth and deficient in many things of a scientific and social nature. It is also generally accepted, however, that the South is rich in natural and human wealth. It needs only the development of this natural wealth and the utilization of the human wealth for the creation of such artificial wealth as accumulated capital, as a means of securing material and social satisfaction. It is necessary that we consider these deficiencies and develop or alter them where necessary in order to maintain an economic balance with the nation as a whole.

Artificial wealth depends upon technological skills developed in connection with institutional services. Without intelligent effort directed in this way it is not possible to utilize adequately the natural resources.

Since we are relatively poor as a region and since agriculture is our leading industry from which a large part of our wealth is derived, it naturally falls that there must be something wrong with our system of agriculture. In South Carolina, a typical southern state, the one crop system has long been hailed as the main evil in the face of agricultural progress and prosperity.

In South Carolina cotton and tobacco, and especially the former, are recognized as the great cash crops of the state, and it is upon cotton that the very economy of the people is based. But cotton is losing its relative position in world trade and its extensive cultivation, as a row crop, has permitted serious exploitation of soil fertility. It naturally falls that a more diversified system of agriculture has to be adopted if we hope to build a profitable and permanent system of agriculture in South Carolina.

There is a major obstacle, however, in developing a suitable diversified system of agriculture, and that is the high acidity of the soils in our state. The soils of South Carolina are naturally acid, but the long and continued use of fertilizers in the production of such acid-tolerant cash crops as cotton and tobacco has greatly intensified this acidity.

From tests made on over two million soil samples taken from different sections of South Carolina, it was learned that approximately 40 per cent of

the agricultural lands in the state are so extremely acid that they are not capable of producing a sufficient income for a satisfactory standard of living. Even cotton and tobacco, the crops which are most resistant to high soil acidity, cannot be grown economically on these lands.

Another 40 per cent of the agricultural land was found to be of a moderate acidity which will enable cotton and tobacco to be produced only if relatively large amounts of fertilizer are used.

Only about 20 per cent of the cultivated land was found to be of a low enough acidity to support a profitable live-at-home program. A large proportion of our total agricultural profits are derived from this land, which is far too small proportionally to affect materially the agricultural income of the state.

It is only through the use of lime that this soil acidity can be corrected, and it follows that it must be corrected if we are to develop a suitable diversified system of agriculture including major livestock enterprises, which are necessary for the much needed live-at-home program.

Under the present system there seems to be a concentration of farm labor during the months of March, April and May in the spring, and September and October in the fall, while there is a sharp drop in the labor during the rest of the year. This is accounted for by the cultivation and harvesting of our present predominating crops. There also seems to be, under the present system, a rather slow turn over of the capital investment. This condition can be remedied by growing other crops and producing more livestock, which will provide productive work throughout the year and also insure a more even distribution of the income.

It has been through the efforts of Dr. H. P. Cooper, Dean of the School of Agriculture at Clemson College, that the attention of farmers and farm leaders has been focused on this serious problem. Dr. Cooper, realizing that the future of southern agriculture lies in the remedy of this problem, has assumed the leadership in making this remedy effective in South Carolina. In his report on the soil acidity problem in South Carolina, Dr. Cooper

(Continued on page 33)

# Livestock Coming South

W. L. EIDSON, '41

IT IS well understood that diversification is one of the best answers to the present problems of the farmer. We are also aware of the fact that the use of livestock is the most satisfactory method of balancing the South Carolina farmer's program.

There is a distinct need for an increase of livestock in South Carolina. It was recently reported that of 160,000 farms in South Carolina there are 66,000 with no hogs, 52,000 with no cows, and 19,000 with no chickens. It was estimated that if imports of livestock products to South Carolina were suddenly stopped, this state would have only enough such products of her own on hand to supply a regular diet for a period of six months. These are facts of which South Carolinians should be profoundly ashamed.

Workers in Animal Husbandry in South Carolina are striving diligently to increase the number and quality of livestock products in this state, and they are very optimistic about the results they expect to obtain. Much has been done to aid farmers in getting started on the road to successful livestock production. Extension workers, county agents, and agricultural teachers have fostered such activities as importations of purebred livestock, feeding demonstrations, cooperative marketing, purchasing lime for the soils, and livestock shows. All of these activities have realized very fruitful results.

For a long time a big need of the livestock industry in this state has been that of improved breeding stock. It was very hard for farmers to secure outstanding animals with which to breed unless they bought them from a long distance. There are now a number of breeders throughout the state who can furnish highly bred animals of the most popular breeds at very attractive prices.

Feeding demonstrations have been a great medium in teaching the farmer how to feed his hogs in such a manner as to produce pork of the quality that would command the highest market prices. Cooperative marketing has opened a channel for the farmer to market his hogs for the highest prices at a minimum cost.

Recently a great drive has been launched to teach the farmers of South Carolina the value of lime applied to our soils and to encourage the use of it as much as possible. Realizing that the soils of South Carolina are acid, and that our best pasture grasses are adapted to alkaline soils, we believe that liming the pastures of this state will prove to

be one of the most profitable ventures undertaken by our farmers in recent years.

Interest in livestock showings in South Carolina are steadily increasing and their value should not be overlooked. Time spent at these shows by farmers is time well spent because after seeing the quality expected of animals by our livestock authorities, they are much better prepared to select and breed animals of a higher quality.

Livestock prospects of the entire South have aroused the interest of our leading meat packers. Mr. F. W. Hoffman, Vice President of the Cudahy Packing Company said, "The South is fast becoming a livestock country. Cattle and hogs, which form one of the most dependable and most important sources of farm revenue, are taking their place in Southern agriculture." We should be very proud of the fact that the livestock industry is steadily increasing in importance in the South. We certainly hope that the livestock industry will live up to the name won by the hog as the "mortgage lifter", and we sincerely believe that it will.

We breed only one breed, the Tom Barron big type S. C. English White Leghorn.

Can supply baby chicks, or chicks any age up to 3 weeks of age. Also pullets any age from 3 weeks to maturity.

We use the latest modern all electric incubators and separate hatchers.

Visitors welcome anytime.

## IVA POULTRY FARM AND HATCHERY

T. C. GRAY, Owner

IVA, S. C.



# AGRICULTURE'S RELATED INDUSTRIES

## Agriculture and Engineering

By CLINTON COOK, '39

ONE look at a modern farm quickly reveals the close relationship that engineering has to agriculture. This relationship extends back to the first civilizations in the great river valleys, where agriculture and engineering began together. Records show that the need for irrigation of the land for the purpose of agriculture developed skilled hydraulic engineers even in the earliest times. Civil engineering in the form of surveying was originated because of the need of boundary lines between farms in the Nile valley. These boundaries, obliterated each year by the river flood, had to be remarked by engineers.

Though engineering and agriculture have always been closely related, it was not until the end of the nineteenth century that the two really began to coordinate their efforts. The invention of the cotton gin by Eli Whitney and the invention of the reaper by McCormick were quickly followed by a series of developments which put agriculture on a mass production scale. The mule has been replaced by the tractor, which has many times the mule's capacity.

With the mechanization of agriculture, it behooves the farmer to become versed along engineering lines. He must be able to maintain, operate, and repair complicated agricultural machinery. At the same time, in order to understand the needs and problems of the farmer, the engineer must have an extensive knowledge of agriculture. Through the study of farming problems, he is enabled to design and build equipment capable of promoting the high standards of modern agriculture.

The closer the bond between the farmer and the engineer is drawn, the greater the advantage to the South, which is principally an agricultural section. Thus, agriculture, with the aid of engineering and its related subjects—chemistry, textiles, and architecture—will soon put the South where it belongs—the nation's number one economic opportunity!

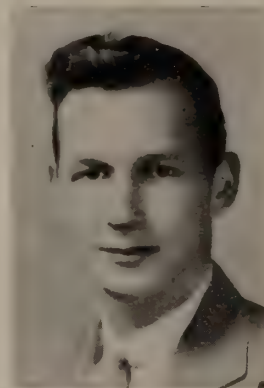


CLINTON COOK  
Secretary Tau Beta Pi,  
Cadet Major, Blue Key  
Fraternity, Mechanical  
Engineer

## Agriculture and Architecture

By T. E. GOODSON, '40

THE government is trying to breathe into the agricultural industry new life, new hope, and ambitions. The south, once called our economic problem number one, is now encouragingly referred to by the patriotic people of the southland as the nation's principal economic opportunity. Millions of dollars have been spent to encourage the agricultural people to work hard for neat, livable homes, to educate their children, to cultivate their land scientifically, and to interest themselves in landscape improvements. In these government projects the architect figures prominently for it is he who



T. E. GOODSON  
Member Minerets,  
Honor Architects  
Fraternity

designs the modern country home, plans the utility buildings on the farm, and arranges their building sites with convenience and quaint beauty in mind. He suggests improvements to houses already standing, from simply whitewashing the houses and fences, to entirely reconstructing delapidated dwellings. Rose trellises, and flower stands are used to promote interest in flowers, and general landscape improvements. Methods of landscaping are suggested with their costs and results primarily considered. Clean yards, low hedges, whitewashed fences and houses, concealed trash piles and stock pens, all in time make a man take pride in his home. Without this pride he becomes a hopeless machine and a dissatisfied, unpatriotic citizen.

Of this nation's industries, two stand out predominantly for their tremendous influence on the prosperity of the country as a whole. These are the agricultural, and building industries, respectively, the sources of man's food and shelter. In such fundamental terms, the importance of these economic activities becomes obvious.

It is an axiom among the nations of the world that agricultural prosperity means a natural civil prosperity, or one based on sound economic principles. Through such business security, architecture is allowed to flourish, and express the people of the period.



# *The Rise of the Peach Industry in South Carolina*

By R. J. FERREE, '39

THE year 1920 marked the beginning of a new era in peach production in South Carolina.

There were three outstanding factors largely responsible for this: the appearance of the boll weevil; the stimulus of very high prices for peaches in Georgia; the Sandhills of North Carolina; and satisfactory results from previous plantings in this state.

Previous to 1920 there were a few commercial orchards. Col. R. B. Watson of Ridge Springs in Saluda County is credited with shipping the first peaches from South Carolina. He had a very small commercial orchard from which he made his first shipments in 1872, according to the most reliable information available. The first orchard of any importance planted in the Piedmont section was that of Mr. J. V. Smith of Greer. Other plantings of minor significance were made in McCormick County in 1916.

Disease played an important role in the early era of the fruit industry. In the early nineties, for example, planting in the Ridge Spring section was cut short with the advent of the San Jose scale, (pronounced San Hozay). This insect, with others, caused practically a complete abandonment of this early enterprise but soon after 1900, a control for the San Jose scale was developed.

A few small commercial plantings were made in Spartanburg, Greenville, Chesterfield and Laurens Counties in 1920, 1921, and 1922. These plantings, with others in those counties, especially Spartanburg County, continued to grow at a more or less uniform rate until 1933, at which time plantings increased tremendously. From 1933 to 1938 plantings more than doubled and in Spartanburg County were more than tripled. In the last eighteen years the number of trees have increased from a comparatively few thousand to a figure well over three million.

It is not known when the first car of peaches was shipped from the state, but in 1923 there were only sixteen cars shipped. The rate of shipments increased steadily since 1923, the total crop amounting to 3,000 cars in 1938; 1737 cars were shipped by rail, and the remainder shipped by trucks or sold locally.

Spartanburg County quickly sprang into the lead in the number of trees planted and the number of cars produced. At the end of 1922, Spartanburg

had 14,812 trees in commercial planting, and the increase in this county to the present date has been largely responsible for the enormous increase in the state. Rising from insignificance, Spartanburg County now ranks within the three top-ranking counties in the United States in growing peaches for the fresh fruit markets.

According to the most reliable figures obtainable, there were over two million trees in the state at the end of the 1937-38 planting season, this figure including only plantings of 500 or more trees. To bring the figure up to date and to include plantings of less than 500 trees, the figure is increased well beyond the three million mark. The following is a list of the ten highest counties in South Carolina listed in order of the estimated number of trees, which includes all plantings, regardless of number: Spartanburg, 1,600,000; Chesterfield, 250,000; York, 175,000; Saluda, 167,000; Greenville, 150,000; Cherokee, 145,000; Edgefield 115,000; Laurens, 67,000; Kershaw, 60,000; Lexington, 48,000. Less than one third of the trees planted are in production, and a safe estimate of the crop five years hence would be from eight to ten thousand cars, five thousand cars or more coming from Spartanburg County.

The principle variety grown is the Elberta, and of the dozen others grown, the Elberta comprises seventy-five per cent or more of all varieties. The Hiley variety is next in importance, followed by Golden Jubilee, and Early Rose. Recently varieties similar to Elberta, but maturing later than the regular Elberta, have been planted rather extensively. The Elberta variety is almost ideal for the Piedmont when the different ripening dates are considered for the Southeast. It follows the Elberta season of Georgia and is earlier than the main varieties grown farther north along the Atlantic Seaboard.

The success of this comparatively new enterprise is due to several factors, foremost of which are the highly developed cultural practices, standardization, and marketing. The Experiment Station and Extension Service have rendered invaluable service to the growers by giving advice and solving their problems. The Extension Service has a demonstration plot near Inman under the direction of Mr. E. H. Rawl, and it has been of great value to the peach industry in that locality. In 1935 an unbalanced nutrient problem showed up in several orchards, and it was found to be caused by applying only nitro-



gen carrying fertilizers year after year, with the result that the supply of phosphorous, potassium, and calcium became deficient. This problem was solved and the solution demonstrated in the Extension Service demonstration plot. The Experiment Station has two experiments in progress on Orchard Nutrition under the direction of Prof. A. M. Musser. One of these experimental plots is located in the orchard of Mr. R. B. Blackwell, near Inman, and the other is located in Land Bros. orchard, near York. These projects will be of great value, for they give promise of producing far-reaching results on a more permanent basis. The experiments carried on at the Sandhill Experiment Station have been, and are, greatly aiding the growers to solve their orchard problems, principally problems of nutrition. The two experiments in the Piedmont have only been run two years and very few of the results have been released, while the experiments at the Sandhill Station have been run a number of years and the growers in that locality have already been greatly benefited by the results obtained.

South Carolina growers have marketed their peaches cooperatively since 1923, when the South Carolina Peach Growers Association was formed. This cooperative marketing agency has enjoyed success from the beginning, and it has grown steadily since its establishment. The home offices are now located in Spartanburg and Mr. T. H. Cribb has been the manager since the removal of the offices from Florence to Spartanburg. This association has very efficiently handled at least seventy per cent of the Spartanburg County crop and about fifty per cent of the total crop of the state last year. It is the policy of this organization to promote the production of better fruit, put up a superior pack, and to get the fruit to market in the best possible condition. This policy is getting results, since the peaches handled are beginning to be given preference on the eastern and western markets because of the quality and condition of the fruit.

A new phase in the promotion of the peach industry was undertaken last summer. Because of market conditions prevailing prior to the shipping season, an advertising campaign was started to induce a greater consumption of fresh peaches. This new undertaking was so successful that growers of North Carolina, South Carolina, and Georgia are laying plans to put the advertising campaign on a larger and more permanent basis. An advertising campaign is a very wise move in view of the fact that when the trees now planted begin to bear there is a prospect of an annual production of over ten thousand cars of peaches in South Carolina.

## BALENTINES

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PURE LARD  
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Daily Year Around Market For Live Stock  
Bring Your Hogs To Our Stock Yards—Our  
Prices and Treatment Will Please You

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## CONSCIENTIOUS FERTILIZER SERVICE!



Swift & Company considers it good business to view each transaction from the standpoint of the farmer. We know that our success is closely tied to the success of agriculture.

It is a determination, conceived many years ago, that Swift's Red Steer Brand fertilizer will always represent a full measure of benefit to the user.

SWIFT & COMPANY  
FERTILIZER WORKS

COLUMBIA — GREENWOOD — WILMINGTON



# FLACK, A WORKING COLLIE

J. M. LAPHAM, '39

I am His Highness' dog at Kew;  
Pray tell me, Sir, whose dog are you?"

*Pope—on the collar of a dog.*

There are three distinctive strains of Collies: the bearded collie, the sable and white collie, and the working collie. Most of use are familiar with the first two strains, but have never seen a working collie. The reason is evident, because there were only two such dogs in the United States back in 1922. These dogs were named "Flack" and "Mattie", and it is in Flack that we are interested.

Flack was born in Scotland, and could not understand our language at first when he was taken to Chicago by Sam Stoddart in 1920 for the Chicago International Exposition. But in two months time he was working daily before an audience of thirty-thousand people.

Shortly after this Flack was purchased by Senator Johnson N. Camdem of Versailles, Kentucky. Senator Camden presented Flack to E. W. Cook, famous Scotch Shepherd in charge of the Hampshire flock on his estate.

Herding and cutting out sheep, that was Flack's work and joy. For he and his ancestors for centuries have been bred to do this work.

Can't you just see Flack out there in the field, standing at attention, waiting for Col. Cook to give the signal whistle that says, "Round up"?

The flock of forty ewes were grazing over a thirty-acre paddock widely scattered when Cook gave that long penetrating whistle and Flack was off. Running low to the ground he circled three times, and in three minutes, there was the round up, with Flack on guard, not a muscle moving. Neither did he make a sound for Flack never barks, but with swift vibrations of his sentient body he held them in absolute subjection until the next signal—a long slow lift of the shepherds crook and five whistles said "cut out five." Four minutes and Flack holds the five rigid in the open, just wavering his tail with something of a hypnotic movement. Then the lifted crook as before, said "Cut out two," and it was done. Not just any two, but the right two and then brought straight to the shepherds feet where the crook could reach and hold them.

Next the lowered crook and one whistle said

"Cut out one". That looked easy, but when the master demanded that one be penned and held in an open gateway, well, Flack was equal to it. How he did it we don't know, before such ability mere human opinion stands abashed. But hold that excited, panting, vibrating ewe he did, while the camera did its work, and a bit longer while we stood in awed wonderment at such motionless mastery of will over



Flack at Work

will, for the ewe wanted to go, to jump stiff legged and bound away and join the flock across the clover field. She swayed, she lifted a foot, but that was all. Not one step did she, or dared she, make until, obeying the wave of the crook, Flack released his mastery and come to heel.

Flack has a strong character, for not even the choicest tidbit would tempt him to the courtesy of breaking bread with strangers. He only eats once a day, and that at the hand of his master at bedtime—the time when the click of a snaplink fastens into his heavy collar and he is tied up for the night.

Today Col. Cook lives at Clemson College as shepherd and Animal Husbandryman. He is giving his knowledge of sheep and animals to the state of South Carolina, and perhaps some of you saw his sheep dog demonstration during the Fort Hill Pageant a few years ago.

But there was a tear in Ted Cook's eye as he told me this story, for Flack has left his master's side to go where all good dogs go.

(\*) Rewritten and condensed from; American Sheep Breeder, March, 1922.

"Home-Made Feeds From Home Grown Products"

"GREAT SMOKY BRAND"

Live Stock and Poultry Feeds

THE IODINE STATE FEED MILLS

Greenville, South Carolina

CUSTOM GRINDING — MIXING — MOLASSES  
PROCESSING



# Editorials

## Come To South Carolina

When a person has something of value that he wishes to sell or share, he usually advertises. That is exactly what *The Anderson Daily Mail* did in their fortieth anniversary edition. In this case *The Daily Mail* offered the resources of South Carolina to the people of the United States.

In this edition *The Daily Mail* portrayed the glorious past, the many years of progress and the present high status of development of Anderson and of South Carolina. But in spite of the present extent of development, it was emphasized, the surface has only been scratched. There remains room and opportunity for a great deal to be done. Our vast untapped natural resources and our readily available human wealth offers opportunities unmatched except by those of our neighboring southern states.

In South Carolina, it was pointed out, we have mountains and a seashore, ideal for vacationists; a climate and population, pleasing to homemakers; and a new frontier of opportunity for the establishment of a business or an industry.

Not only *The Daily Mail*, but the people of South Carolina as well are behind this movement to inform the nation of the opportunity existing in our state. This is evidenced by the fact that such a voluminous edition, which totaled one-hundred and sixty pages, could not have been possible without the cooperation of the advertisers.

These advertisers represent the people of South Carolina: the businessmen, the farmers, and the industrialists. Thus *The Daily Mail* is a medium through which the opinions and policies of the citizens of South Carolina are expressed. *The Agrarian* is a medium through which the opinions and policies of the students of Clemson College are expressed. It is of no small consequence that we have the same enthusiasm and ideas as do the present leaders of our state. We are only too anxious to assume our position in South Carolina and to help make it a richer state than ever before.

We of *The Agrarian* wish to extend the invitation first extended by *The Anderson Daily Mail*: "Come to South Carolina." R. L. A.

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*H. A. Woodle*, a graduate of the Agricultural Education class of '23, is now County Agent of Aiken County.

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*D. A. Shelley*, a graduate of the Animal Husbandry class of '37, has recently been appointed County Agent of Abbeville County.

## Where There Is A Will, There Is A Way

The fact that the South is criticised as the nation's economic problem number one, agriculturally and otherwise, is generally accepted, but judging from the enthusiasm shown by the citizens at the recent farm machinery demonstration day at Clemson they are determined to overcome this handicap by keeping pace with all new developments and methods. We are in dire need of new methods, new developments and new industries here in the South, and the only way to acquire these is to first secure the interest and cooperation of the people. We sincerely hope that the interest taken in the farm machinery demonstration is typical of the entire South, for if it is and if the old saying "where there is a will there is a way" is true, then certainly the South is on the road to economic prosperity.

In this region so rich in natural and human wealth, agriculture is still the primary industry; so, naturally, we look first to agriculture when seeking a solution to our problems.

The farmers and farm leaders who attended the demonstration did so with their eyes and minds open to any suggestions rendered by the various farm machinery companies represented. These men took all the exhibits in, weighed the possibilities, and conceived new ideas on how to improve their own farms.

If the farmers were anxious to learn about the machines and their possibilities, then the companies were doubly anxious to serve. Any group of companies which are willing to exhibit between \$50,000 and \$75,000 worth of equipment free of charge may truly be said to be cooperating with the farmers. With this spirit of cooperation there are no agricultural problems which cannot be improved or overcome. R. L. A.

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*B. O. Williams* was a graduate of the first Vocational Agricultural Education class at Clemson in 1918. He is now professor of Rural Sociology and Statistics, and is Rural Sociologist on the Agricultural Experiment Station Staff at Clemson. Dr. Williams received his M. S. degree at the University of Virginia in 1929 and his Ph.D. at the University of Minnesota in '38.

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*F. D. Cochern*, a graduate of the Horticulture class of '32, is assistant Horticulturist at the Louisiana State University, University, Louisiana.



# South Carolina's Golden Weed

TO THE purchaser it is a package of cigarettes or cigars; to the botanist it is *Nicotiana tabacum*, but to the South Carolina grower it is the Golden Weed. Though not cultivated in the Piedmont, tobacco holds an important place in the economic system of our Pee Dee section.

Tobacco, unlike most of our important crop plants, is native to America. It was cultivated by the Indians at the time of the discovery of America. The use of tobacco soon became popular in Europe. As the chief export from the young colonies, it played an important role in colonial economics. Commercial tobacco production began in Virginia in 1612 and soon spread to neighboring states; however, it was not until 1890 that it became commercially important in South Carolina.

Aided by the boll weevil invasion with its consequent check of cotton production, tobacco made a steady increase in the Pee Dee area. Depression and crop control caused a decrease but the loss has now been overcome.

Tobacco ranks as the nation's seventh most valuable crop with a farm value of nearly \$250,000,000. In South Carolina this crop occupies only two per cent of the crop land; however, the returns from tobacco are high proportionally. Eight counties have as much as five per cent of crop land in tobacco. Horry county is highest with 25%.

Soil requirements for tobacco are unique. This explains its production in small, widely scattered areas. For example, Lancaster County, Pennsylvania is considered one area within itself.

Tobacco makes a rapid growth during a short season and requires readily available moisture, yet it is quite sensitive to poorly drained conditions. Phosphorous and potassium requirements are high so liberal fertilization is necessary. Nitrogen requirements are low, especially for the bright leaf type grown in this state. There are certain special correlations between tobacco quality and presence of certain nutrients. An excess of sulfur causes an undesirable red color. Chlorine above the small amount necessary has a burning effect. Deficiencies of copper, boron, manganese, iron and zinc have at times been noted on very light soils. A moderately acid soil proves best for tobacco so liming is unnecessary.

There was little work done by our experiment stations to improve tobacco until 1930 when co-operative experiments were begun by the U. S. D. A. and state workers at the Pee Dee Station at Florence. Important contributions, including new fertilizer mixtures, methods of fertilizer application, and

cultural practices, have resulted in an improved quality of the product.

In 1932 blue mold, a new plant bed disease, caused great damage.

First attempts at control were ineffective, but recent experiments indicate that fumes from para-dichlorobenzene proves effective. Daily applications are made and the gas held on the plants at night by a heavy cover.

What does the future hold for our state's tobacco farmer? A good proportion of our exports have been lost. There is little possibility moreover that increased domestic consumption will prevent a surplus as was the case when women began smoking, with the result that acreages much above the present levels will produce a surplus with a consequent drop in price.

Of growing concern to South Carolina farmers is the spread of producing areas in Georgia and Alabama. Will these areas offer serious competition and cause a westward shift in tobacco similar to that of cotton? We think not.

This bank extends congratulations and best wishes to the graduating class of '39 and suggests that when you leave the campus and go out into the business world that you bear in mind these words by Rudyard Kipling:

"Any fool can waste, but it takes something of a man to save; and the more he saves the more of a man it makes him."



The Jackson County Bank

Sylva, North Carolina

Member F. D. I. C.





D. B. ANDERSON  
Master S. C. State Grange

GUEST EDITORIAL

## Organized Agriculture

**A**BOUT seventy-two years ago Oliver Hudson Kelley, commonly spoken of as the "Father" of the Grange, declared that the greatest need of the American farmer was organization. We are wondering if it is not the farmers' best friend in this day of group action. Self-help is our most dependable help.

But the farmers of America have come a long way on the road toward organization since the days of Oliver Kelley. The Grange is still the largest general farm organization in America and has to its credit a long list of accomplishments for the farmer in the field of education, legislation, and co-operation. But there are hundreds of other organizations which serve the farmer today and are doing their part in helping to bring about a better day for Agriculture. The American Farm Bureau and the old Farmers' Union, both with large memberships, are nationwide in scope and are helping to fight the farmers' battles.

We hear much about the cooperative movement among farm people. We are told that there are more than 15,000 farmer-owned and farmer-controlled cooperative associations and mutual companies which operate in the United States. Over ten thousand of these are engaged in marketing farm products and purchasing farm supplies. It is estimated that more than three million persons hold membership in these organizations, and that the sales of farm products and farm supplies by these cooperatives now exceed two billion dollars annually. Farmers mutual fire insurance companies

## SPRING'S REVELATION

T. E. GOODSON, '40

Ceres starts her work without.  
The trees new leaves begin to sprout.  
The warm wind sways the daffodils,  
Then running, twirling, tops the hills.  
She takes the lilac's sweet fresh breath,  
And boasts to the world of her perfume theft.

Thrift, verbena, and tulips gay,  
Run 'round and 'round in endless play.  
Azaleas flash their colors bright  
That richen and deepen in evening light.  
The dogwood speckles the cloudless sky,  
And hungry squirrels scamper by.

Spirea falls in white cascades.  
The oaks begin to cast their shades.  
The tracery of the flowering peach  
Stretches high in yawning reach.  
The ploughman turns the vital sod,  
And I see nature, life, and God.

number 1900. In this way farmers of America are carrying over one half of their own fire insurance, at a tremendous saving. Mr. F. F. Hill, Governor of the Farm Credit Administration, recently made this concise statement:—"Marketing the products of the farm and the ranch, purchasing the necessary supplies to grow them, and obtaining the required credit to carry on farming operations, are all as much a part of the business of farming as producing crops or livestock. Singly, farmers today are in no position to bargain effectively with established groups in these fields."

The public generally is sympathetic toward farmers cooperatives. This is evidenced by the fact that in every state, laws have been passed favoring the incorporation of farmers' cooperatives.

We believe the future of organized agriculture was never brighter. Our farm boys and girls are being trained to cooperate as never before in the history of our country through thousands of Four-H Clubs and F. F. A. Chapters. The farmer's best friend is the three horse team of *education, cooperation and organization.*

### CALL FOR ROYAL CROWN COLA

On Sale at the Jew Shop  
and all other Clemson places where drinks are sold  
NEHI BOTTLING CO.  
Anderson, S. C. "Buck" Barton

# The Progressive Farmer's Holiday

By R. L. HEARON, '40

ON APRIL 27, farmers from every part of the state trekked toward Clemson College, and upon arriving they were treated to as fine a demonstration of the latest power units, tractors, tillers, and harvesters as has ever been put on in South Carolina. It was a colorful, noisy, festive, but attentive crowd that watched the machines roll up and down the fields turning up the fresh earth into ever changing patterns. This heterogeneous gathering of farmers, students, and professors were interested spectators at a show that had everything a successful show should have—color, precision, competition, and a gay festive atmosphere. There people saw the finished product and enjoyed and appreciated it. Could they have seen the preparations that were made before the demonstration they would have appreciated it even more.

It was a small group of agricultural students, composed mostly of Agricultural Engineers who got the biggest kick out of this show, for it was this group who had seen these machines before they were assembled. It was this group who had watched the conglomeration of iron, steel, and wood unloaded from the train and placed in a bewildering mass at the Farm Machinery Building. It was these boys who assisted the company representatives in sorting this chaos of parts into orderly piles, and then helped assemble these parts into rugged, smooth working implements. These boys worked hard and long; they followed complicated instructions, they sweated, they skinned their knuckles and swore softly, but when they had finished, they felt that they had done a hard job well. They had gained invaluable practical experience and insight into the workings of various machines, and could thus truly appreciate those machines which the crowd saw working so smoothly.



The Machinery Demonstration

To the onlooker who viewed only the tractors and implements, it was an interesting day. To the spectator who saw not only these things, but who also saw the crowd, the day was doubly interesting. The red, green, orange, and yellow machines weaved up and down the fields leaving a trail of fresh, smelly earth behind them; the stench of hot oil and gas permeated the air; the shouting voices of gesticulating men contrasted sharply with the smooth, powerful explosions of the motors. The clashing and scraping of metal, all blended into one tremendous wave of noise from which it was impossible to escape. There was no slowing down of these machines during the day, no easing up on the strain which had been put on them, for there was too much good natured competition between the companies for any slackness or failures. These people were potential buyers and they had to be shown what these tractors and implements were capable of doing.

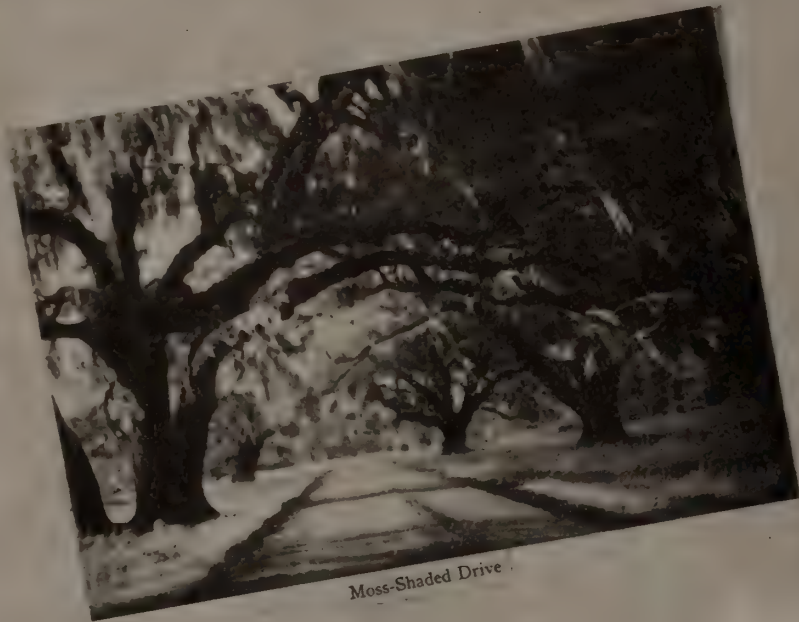
It was only when the sun began to sink into the purple haze in the west that the people began to trickle away. As the crowd diminished, so did the noise, and the hubbub became more and more subdued until finally there was no crowd nor any noise, only a handful of tired but satisfied boys and men who still had the job of moving these machines, but who were content that another Farm Machinery Day had gone over in a big way.

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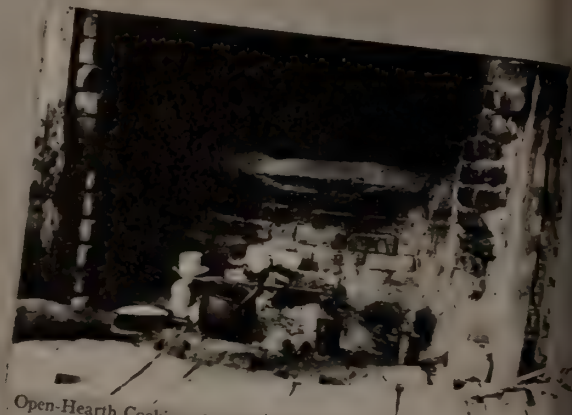


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Moss-Shaded Drive



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## LOW COUNTRY



"Picking Cotton"



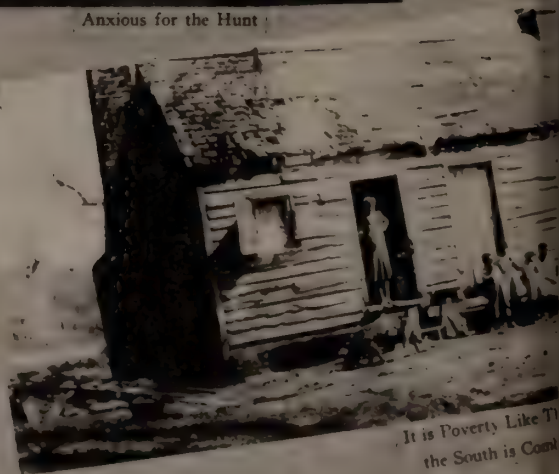
Tidal Flats Near the Seashore



Anxious for the Hunt

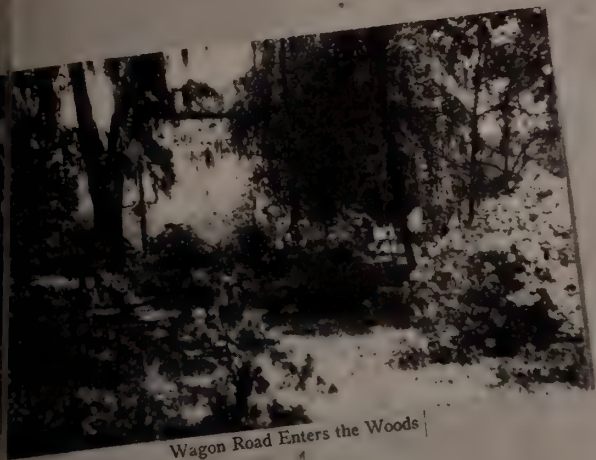


"Low Country" Estate Near Charleston



It is Poverty Like This the South is Com





Wagon Road Enters the Woods



A Common Roadside Scene



Lovington. Where the Moss Reaches Down to the Water

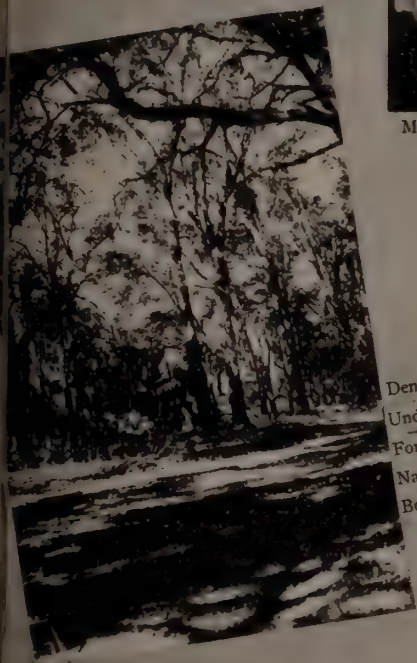
## SCENES



Many "Low Country" Lassies Are Excellent Riders



Thick Underbrush Hides the Water Edge



Dense Tropic  
Undergrowth  
Forms  
Natural  
Beauty



Historic Remains of a Once Prominent Church



## MAKE PROFITS BY USING LIME

By JESSE M. BAKER, '40

THE practice of applying lime to the soil for the purpose of increasing crop yields is not a new one, because records show that as early as 500 B. C. the Celts made use of chalk and marl for this purpose but only in recent years has the importance of this practice been realized. By repeated experiment and observation, soil reaction has been found to be one of the major factors affecting crop production on mineral soils, so this is the basis on which liming recommendations are made. As liming of the land is accepted as a fundamental and necessary practice by all who are well informed in the matter, it is essential that every one engaged in agriculture become familiar with some of the roles which lime plays in the soil.

One of the primary reasons for applying lime to the soil is to correct acidity. High acidity, especially in clay soils, is very likely to bring about toxic concentrations of iron and aluminum salts which could be tied up in the soil so as to be non-toxic if a suitable application of lime was made. It has also been found that an application of lime tends to increase the availability of phosphorus in the soil. As the activity of many soil micro-organisms which break down complex organic material to simple end products are greatly retarded by an acid reaction, it is imperative that lime be added in order to correct this condition so that more plant nutrients will become available. Lime also helps the physical condition of sandy soil by acting as a binding agent and tends to adjust the physical properties of clay soils toward a higher plane of production by increasing flocculation.

There are several kinds of lime commonly found on the market included under the term agricultural lime which is a term used to designate all compounds of calcium and magnesium employed in a practical way to correct soil acidity. Among the more common materials used for this purpose are ground limestone, hydrated lime, marl, burnt lime, and oyster shells. When such coarse material as oyster shell and marl are used as soil amendments, they should be ground fine enough that 60% will pass through a 100-mesh sieve. All of these materials have been found to give satisfactory results when applied in the right amounts so the local market prices and hauling charges from market to farm will be the major factors determining which type of lime to use.

Before liming recommendations can be accurately made, the pH of a soil must be known. This can be

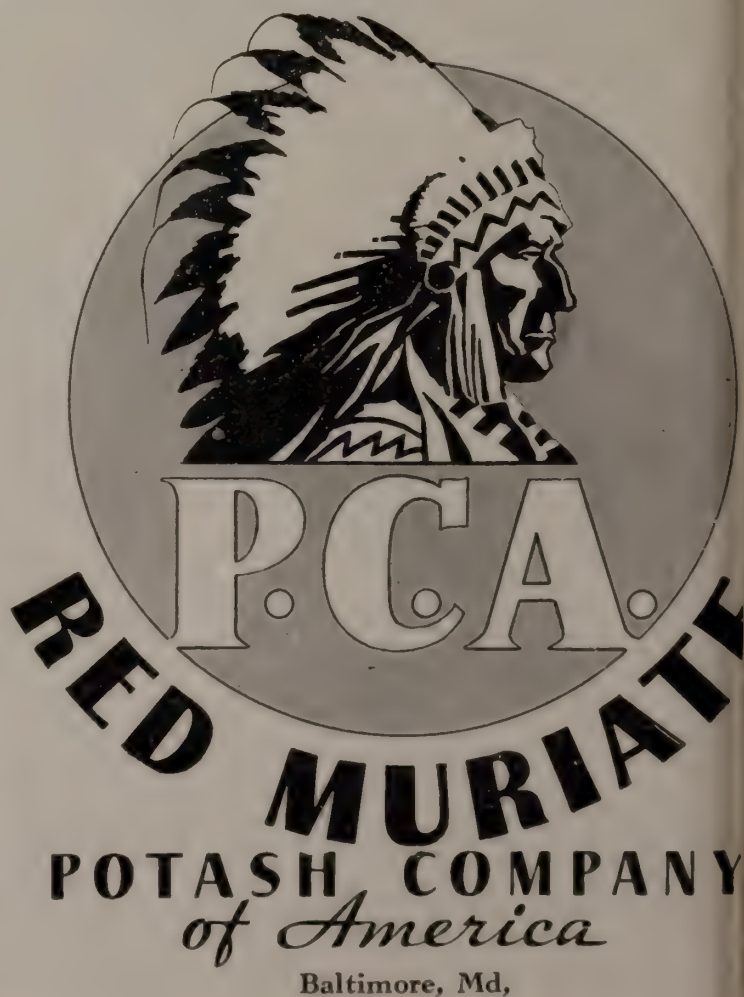
found out by the farmer sending his soil samples directly to the soil testing laboratory at Clemson College which service is done for him free of charge. After this is found out the farmer can refer to a liming chart which he can obtain from the extension department of Clemson College recommending the amounts of lime to apply to his soils based on the pH. As there is a greater danger in over liming some soils such as the grey soils of the coastal plains region care should be taken in applying this soil amendment. A good plan to follow is to visit your local experiment station and let them recommend the kinds and amounts of lime to apply to your soils.

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*T. F. Cooley*, of the Dairy class of '38, left the South Carolina Extension Service April 15, 1939 for a new position as manager of the Klondike Farms, a famous Guernsey Breeding Establishment at Alkin, North Carolina. Mr. Cooley has been associate dairy specialist with the South Carolina Extension Service. Pryor to that time he was assistant county agent at Newberry.

*F. M. Gray*, a graduate of the Dairy class of '34, has recently been made manager of the Southern Dairy plant at Miami, Florida. Mr. Gray had been in charge of the seal test laboratory in Miami for several years.

*George H. Wyse*, a graduate of the Dairy class of '30, is associate Dairyman on the experiment station staff at Clemson. Mr. Wyse received his M. S. and Ph. D. degree at the University of Minnesota.

*J. E. McCurry* received his B. S. degree in Entomology with the class of '38. He took graduate work immediately after graduation at the University of Florida. Mr. McCurry is now back at Clemson as assistant in Dairying, and is in charge of advanced register testing.

"From A Snack To A Banquet"

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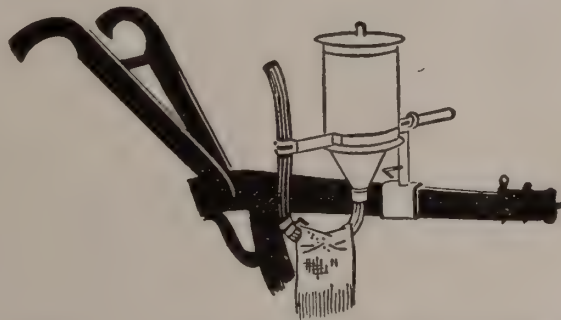
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# A Successful Poultry Farmer

By HARRIS L. BEACH, '39

What is the future for vocational agricultural education? Is it accomplishing anything that tends to establish our rural youth as farmers on a permanent basis? Well, let's look at the results one agricultural teacher got from one of his students and then I'll let you draw your own conclusions.

In 1922 Professor C. L. Barnette, agricultural teacher at Iva High School began working with his boys on the possibilities of starting their school projects. Some boys decided upon livestock projects while others stuck to crop projects. One freshman, T. C. Gray, chose chickens as his enterprise. He did not have very much assistance financially, but "Where there's a will there's a way." During the same time he was living in a community atmosphere where most of the poultry flocks consisted of mongrel chickens, so under these adverse conditions young Gray set out with a world of ambition and energy but at the same time with very little capital.

With ten hens and one rooster of the Tom Barren strain and a house 8 feet square young Gray began his colorful career in the poultry business. Under careful supervision of the agriculture teacher small profits were received from these first few hens, so this energetic young boy decided to increase his flock paying careful attention to the selection of only the best birds for breeding purposes. When 1926 came along young Gray was deeply absorbed in the poultry business with possibilities of expansion. His flock now consisted of 800 layers of new blood lines. At the same time he was continuing to pay close attention to culling, breeding, and record keeping.

Besides from being systematically enrolled in vocational agriculture, young Gray was a Four-H club member. From Four-H club work, under the supervision of the county agent, he received valuable aid in poultry management and at the same time had a chance to participate in judging contests, thereby gaining useful knowledge as to the selection of breeding stock and good layers. At this point he was on the verge of graduation and it was necessary for him to decide upon what he was going to do—go off to college or start in the poultry business on a commercial scale. Due to his huge success with poultry and the unlimited possibilities for expansion he turned to the poultry business as a life's work.

As time passed on new blood lines were introduced into the flock through the main medium of high record males, along with the continuation of careful culling and record keeping. Besides improving the flock much building was taking place. Laying, brooding, feed, and storage houses were under con-



A part of Mr. Gray's flock of Leghorns  
The hen houses in the background

struction. Young Gray had now increased his poultry business to the extent of 1500 birds and had purchased a 7,200 egg capacity incubator. He continued to expand his business and was now enjoying a large sale of young chicks. All Southern states patronized The Iva Hatchery and it was necessary to increase his hatchery business to 20,000 capacity. With the large demand for baby chicks, Mr. Gray paid more attention to his breeders than ever before, because he had stiven to get satisfied customers and he felt it his duty to keep them.

At the beginning, young Gray started out on his father's farm but gradually drifted to another farm so that his business would have room to expand. Today, he has one of the largest and best equipped hatcheries in the South. His mailing list, covering the entire south, is made up of approximately 5,000 names. His poultry plant is composed of 42 buildings of the latest design and contains the most modern fixtures. A farm of 140 acres takes care of all breeding and experimental work Mr. Gray cares to carry on in further perfecting his poultry business.

From these facts, it seems that it is quite obvious that Vocational Agriculture and Four-H Club work have passed the stages of experimentation and are now essential in every rural area. From ten hens and one rooster to one of the largest and best equipped hatcheries in the South is concrete evidence that our rural youth still have a chance to make a go agriculturally providing that they are energetic and have the proper supervision, so "Hats Off" to Mr. T. C. Gray of Iva, South Carolina, who has made a great success and has set an example worth following by any rural youth.



# How Cheese Came To Be

..... the invention of cheeses and cheese culture is very old; early dairy husbandry was very crude and laborious but its study is interesting. ....

HERBERT A. JOHNSON, '40

We have learned from the most recent archaeological discoveries that cheese was made and used two thousand years before Christ. Sanskrit writings dating back to six thousand B. C. tell of the food values of milk much as we know them today. We are sure that the dairy industry was of some importance in these olden days because friezes (carvings) of oxen, maids milking cows, and even calves have been found in old Egyptian and Asiatic rocks. This was hard work and required skillful hands to do it. It is therefore, reasonable to conclude that the cow was even then "the foster mother of the world."

Branding to distinguish one man's herd from another was used as early as 4000 B. C. Many races of people used the cow. For example, the famous Vedic hymn of India mentions the cow as the benefactor of the Hindu race. These people drank the milk and ate the butter.

Today we study milk very intensively for all of its physical and chemical properties but Aristotle wrote many things concerning cattle and the chemical composition of milk. From the earliest data we learn that the principal users of butter, cheese, and milk were the herdsmen themselves. This included nearly everybody because almost every family had a herd of cattle which was tended by the father or the sons of the family.

The first mention in the Bible of a dairy product is in Genesis and reads as follows:

"And they took butter and they did eat." In Judges the author mentions milk and butter when praising Jael the wife of a Kenite. Butter must have been considered a luxury for he says:

"He asked water and she gave him milk; she brought forth butter in a lordly dish."

The texture and quality of butter was noticed then just as much, probably, as it is today. In Psalms, David says:

"The words of his mouth were smooth as butter but war was in his heart." Some may question it, but Isaiah was truly a great prophet. He even said that some day cows and goats would give forth great quantities of milk. "And it shall come to pass for the abundance of milk that they shall give he shall eat butter; and butter and honey shall everyone eat that is left in the land."

The history of the word butter is in itself interesting. Scholars of history believe that the butter

as translated from the Hebrew is slightly misleading. Butter as referred to in these early narratives is thought to have been some curdled or rich cheese-like material. The Greeks and Romans made a peculiar use of butter, one of our most coveted foods. They used it as an ointment. It was practically the only medicine they knew. The Good Samaritan used butter along with the wine when he bound up the poor wounded man on the road to Jericho. The word butter as we know it today is thought to have gone through a long line of translations. First, it came from the Latin derivative, "butyrum." Then it went into the Greek "boutyron," which came from a combination of two Greek words, *bous* meaning cow and *tyros* meaning cheese. The word dairy comes from the middle-English word which means maid-servant. This proves that most of the milking must have been done by the girls and women.

After Christ, in the year 376, we have a record by the historian Gibbons that Tartars carried cattle into their campaigns to be used for the milk and meat they would provide. Caesar took herds with him in his conquests and invasions. Attributed to him is the honor of having *disseminated* the herds of cattle over the continent of Europe. At this time and also in the days of Jacob, cattle were classified along with slaves as a measure of wealth.

In the fourteenth century gunpowder was discovered. This discovery was very important in the beginning of the domestication of cattle on a very large scale. Because all of the wild meat was killed, men soon came to realize that it would be necessary for them to keep some cattle for the milk they produced as well as the meat which they would give their owners in the form of young calves.

For the first few years after landing in America, the Pilgrims did not have any cows. It was, however, necessary to import them. Until the importation of cattle from the Old World into this country, the people were fast diminishing in their supply of the energies which man can get only from the cow and her products. Many of the failures of the Pilgrims in their first years of colonization have been attributed to the lack of domesticated cattle.

A large store of cheese was also considered as a form of wealth. Reliable information as to the real origin of cheese is not available but we know that cheese history dates back to the folklore of all the peoples of the world. We know that mankind knew



of and was using cheese before ever the English tongue was spoken. Cheese was offered to the Greek gods in the time of Homer. Otesia, an early Greek scholar wrote of a famous Assyrian queen who at one period of her life was fed by birds which stole cheese from the shepherds. Cheese even recently has been found in the palaces of long since forgotten kings and the preserved remains of the feasts of Roman emperors. When the Crusaders were on their march they took cheese as a prize booty. For many years after some wandering Asiatic tribes brought the art of cheese-making to Europe it was considered a very valuable process and protected by the arm of the church. The monks taught the peasants the art. The formulae for the making of cheese were considered as the wealth of the monasteries. Some of our best cheeses even today are made in monasteries. For example, the Port du Salute, a famous soft cheese is made by Trappist monks.

The handed down story of the first true cheese is rather interesting. One day an Arabian merchant who traveled in Asia was preparing for his journey and he filled his canteen with milk. When he stopped to eat his meal he turned the canteen up to his lips to drink but nothing ran out. The rennin had curdled the milk. After succeeding in getting it out of the container he tasted it and found that it was pleasing to his tongue. He experimented and pressed curd. His little accident proved profitable because cheese soon became the means of exchange and barter.

Roquefort cheese boasts an humble origin. It was founded in the Conques monastery in 1070 and made from sheep's milk. The legend of the shepherd boy seems to be the accepted history of the discovery of the moulding process. This little shepherd placed his lunch consisting of some bread and sheep's milk in a small cave while tending his herd. He did not return to eat his food but when passing the same way later he stopped to see if his forgotten lunch was still there. He found that the bread was all covered with mold and the cheese likewise. He broke open the cheese and found little green streaks of mold running through it. Being of a daring nature, he tasted the moldy cheese and liked it. He soon made a habit of leaving his lunch in the cave so that he might eat of the delicious delicacy. It has since been found that nowhere in the world can Roquefort cheese be made like that produced in the Cambalva caves in the foothills of the Alps where this little shepherd boy first discovered the process for that world famous cheese.

*J. Willard Jones*, a graduate of the Agronomy class of '37, is instructor in Agronomy at Clemson. He secured his M. S. degree at Cornell University in '38.

## Our South Carolina Forests

*By J. J. PITTS, '41*

**S**OUTH Carolina's forests are one of its greatest natural resources. As a basic source of wealth and employment in the state, forests are exceeded only by agriculture and the textile industry. In addition to being a direct source of farm income, forests are indispensable in controlling floods, reducing soil erosion, conserving water resources, and in providing opportunity for public recreation and wild life preservation. Of the nineteen and one half million acres in South Carolina, nearly half is in farm woodland areas. Through a broad program of woodland management including protection from fire, thinning for fuelwood, tobacco wood, pulpwood, and cutting mature stands through individual tree selection, it is possible to earn an annual income of two dollars per acre from this timberland as compared to the forty-seven cents per acre as shown in 1935 census.

Farmers can no longer afford to sell their timber for a "lump sum" as they have frequently done in the past. The best method is to sell on the log scale or lumber scale basis. Last year, as an example, a Laurens County farmer was offered a lump sum of \$75.00 for a small section of trees, but instead of selling for this, however, he scaled his logs by international rule and received \$193.50 for them. When selling by a sawmill contract, a person should reserve all pine trees up to and including ten inches in diameter at breast height, and all hardwood trees up to and including sixteen inches in diameter at breast height, with the exception of smaller trees which should be cut for improvement purposes. By so doing he will be retaining a thrifty growing stock of trees large enough to produce another profitable cutting within the next ten years. They will also help seep up the openings created by the cutting of the saw timber. A buyer cannot afford to pay much for small saw timber trees as there is approximately eight times more profit per thousand board feet in lumber cut from a 24-inch log than from a 12-inch log.

Young stands of pines are frequently in need of thinning. Thinned stands often produce sawtimber or poles in less than one half the time required by unthinned timber. In thinning, the classes of trees to be removed are crooked, forked, defective, rough, or of a low grade variety, which, when thinned, can be used for fence posts, fire or pulpwood.

In older crops of trees the farmer should investigate the possibilities of selling more than one class of product. The best quality tree should be marked for pole sale while cordwood may be worked up from the inferior trees and as a by-product of

(Continued on page 33)



# HYBRID CORN

R. C. WANNAMAKER, '40

**M**ODERN corn breeders practice one of two breeding methods—(1) Mass selection or (2) selection within inbred strains for the production of hybrid corn. The development of hybridization of inbred strains is probably the greatest advance in corn breeding in its nearly 450 years of cultivation by white men.

Probably the easiest way to give a general idea of what is meant by hybrid corn is to compare it to the mule. A corn hybrid is a "botanical mule". The animal mule is the first generation hybrid offspring from the mare and the ass; the botanical "mule" (corn hybrid) is the first generation hybrid between two different inbred strains of corn. They both partake of the qualities of both of their parents. Neither of the hybrids just mentioned is used for further breeding, but must be produced anew each generation. The corn hybrid's value lies, then, in its capacity to produce a superior (in quality, quantity, resistance,) crop of corn. The harvest from hybrid corn seed will grow if planted, but there will be a great decrease in production in the immediate crop and in succeeding generations if attempted.

Practically all of the work with hybrid corn has been done in the mid-western states—the Corn Belt. Some of the state agricultural experiment stations have produced hybrid seed, and every station has been impressed with the difficulty of convincing growers that seed should not be saved from hybrid plants for future planting. Practically every farmer attempts to repeat his super-yield by planting some of the seed from his hybrid crop, and learns by experience that the warning of the station directors was right. He gets a crop of low-producing, stunted plants which do not exhibit the vigor of the first generation hybrids.

## *Method Used to Develop Hybrid Corn*

A general summary of the procedure followed by breeders of hybrid corn is this: First, select several varieties of corn which have desirable characteristics. By controlling pollination—self-pollinating each plant and repeating this process for six or seven generations (and by continuous selection), a number of very pure lines are obtained. All of this inbreeding must be done by skilled hands, with excellent technique in controlling pollination, and on a farm especially equipped for specialization in plant breeding work. After the seventh generation of inbreeding—using pollen from a plant to pollinate itself, and excluding absolutely all foreign pollen—nearly all of the "foreign" traits have been

eliminated, but the weaker characteristics of the original strain have been emphasized resulting in less vigorous plants that are very uniform in the major characteristics. Then, two of these pure strains are planted together and cross-pollinated. This crossing of the two pure strains stimulates exceptional "vim and vitality", so to speak, in the seed they produce. These are the hybrid corn seed to be planted by the farmer.

Geneticists have not yet been able to detect the exact factor (or combination of factors) which is responsible for hybrid vigor, but the fact that the hybrid seed do produce a superior crop is readily observed. When hybrid seed are used, an increase in yield over the standard commercial varieties of 15-35 per cent may reasonably be expected. In addition to this increase in yield, the plants may have greater disease resistance, wind resistance, and in general are more vigorous and hardy in every way than in ordinary strains.

The hybrids developed up to the present represent only first efforts in the breeding of this type of corn. Most of the breeding programs are so young that, as yet, there has been insufficient time to build up and improve existing inbred lines by combining the desirable characteristics of two or more lines into a single line. There is considerable concentration of effort on this phase of the breeding problem at the present time, and present hybrids, unquestionably, will be surpassed by hybrids of the future—in yield, resistance to disease, and in many other respects.

The production of hybrid seed corn in the southern states is in an early stage of development, and further time and work is necessary before we can have hybrid corn used extensively. Northern hybrid corn has not, in general, proven satisfactory in South Carolina and other southern states. There is every reason to believe, however, that greater progress will be made in corn improvement in the next 25 years than has been made since the crop came into the possession of the white man over four centuries ago.

For Summer Holidays See—

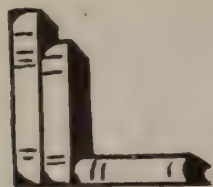
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# Agrarian Philosophy

By HARRIS L. BEACH, Editor-in-Chief



## TRI-STATE INTERCOLLEGIATE CONFERENCE

The Tri-State Intercollegiate Conference comprised of former Four-H clubsters from South Carolina, Georgia, and North Carolina, held one of its most successful sessions at Camp Long, April 28, 29, and 30. All members are former Four-H clubsters and much interest was centered around past experiences both in demonstrations and educational activities.

In an atmosphere of club work and with the theme "Four-H Club Work and Rural Life Development" many outstanding contributions for the betterment of rural areas were accomplished. The purposes were: To provide social opportunity; To better understand the significance of college Four-H clubs; To maintain interest in the extension service and further develop its program; To provide further opportunity for leadership development; and lastly, To better understand problems confronting rural college students.

The session was climaxed with a very impressive address by Mr. C. A. Sheffield, Southern Director of Extension Work, who painted a very dreary picture of the South. He listed our assets as follows: "We have one-half of the land in the South along with many natural resources which include water power, marble, phosphate rock, naval stores, and many more. We have huge cotton fields and brag about our population being over ninety per cent native born." These are indeed assets which any part of the country should be proud of but at the same time he described the liabilities of the South which will make any true Southerner's blood curdle. "We are confronted with poor, eroded soil. We have a low wage scale and have to tolerate high freight rates. Our illiteracy is one of the highest in the country. We have 28% of the nations' population but receive only 9% of the nations' income. Our farmers pay 60% of the entire fertilizer bill. Our natural resources are diminishing and over 48,000 families are slipping into farm tenancy."

Along with the educational part of the Tri-State Intercollegiate Conference much interest was centered around the needs for more social activities in rural areas. One cannot blame our rural boys and girls for leaving their country homes if the social side of their education is being neglected, so in order for our rural communities to hold their youth it is necessary and at the same time their duty to make the environment suitable for their normal development.

**PICTORIAL**—The pictures making up the pictorial section of the magazine were taken by Miss Beulah Glover of Walterboro, South Carolina, who specializes in photography. We are deeply indebted to Miss Glover for the use of these "Low Country Scenes."

**THE COVER**—The cover on this issue was taken by Cadet A. H. Chapman in the school of Architecture and a member of The Minarets.

**THE COVER**—The picture on the cover of this issue is the main building of Clemson College. It is a time exposure photograph taken by Cadet A. H. Chapman, Architectural Student, from Spartanburg, South Carolina.

## GRANGE WORK MAKES A GREAT STRIDE

THE GRANGE, national agricultural fraternity, under the able leadership of national master Louis J. Taber of Columbus, Ohio, is taking the lead in agricultural affairs. Through its representative in Washington and its extensive Grange program it is exerting its energies toward a worthy and far-reaching agricultural program with an ultimate goal of elevating the American farmer.

The Grange, the order of Patrons of Husbandry, boasts of a five point program, namely: *Fraternal*—Being the only rural fraternity in the world it has the fraternal tie that binds. This alone is one reason why the Grange has continued to enjoy a vigorous life through countless years of prosperity and failure of which the farmer remembers well. *Cooperative*—This is the selling point of the Grange. Annually, thousands of dollars are saved by cooperative buying and selling. *Educational*—Every meeting is intended to be educational as well as inspirational to its members. Not only this, but the Grange sponsors numerous educational contests and projects which have proven beneficial in the past. *Legislative*—The Grange employs a man to represent its members in congress. This agricultural statesman is highly respected in all Washington agricultural circles. And lastly, *Social*—The Grange provides its members with healthy amusement, wholesome recreation, and countless opportunities for advancement. This is very essential and is proven by the ancient adage "All work and no play makes Jack a dull boy."

Today, the Grange boasts of a membership of approximately 800,000 paid-up members. It is organized in thirty-five states and comprises over 8,000 local units which hold more than 200,000 meetings every twelve months. These 8,000 local units are housed in 3,600 Grange halls valued at \$26,000,000. Aside from all of this, the Grange is a democratic order as well as patriotic order. Another unique characteristic or earmark of the Grange is that its membership comprises the whole family—Father, Mother, Sister, and Son.

It is quite obvious that the Grange has been a pioneer in the development of America agriculturally and with its sound organization and under its capable leadership it would be a good bet to wager that the Grange will blaze many more agricultural trails in an effort to elevate the American farmer through the main medium of organization.



## Scholarship Opportunity For Farm Boys

*Boys financially hard pressed but wishing to attend Clemson, here's something to investigate.*

THE Sears-Roebuck Agricultural Foundation has made available to the School of Agriculture of Clemson College twenty-two scholarships of \$100.00 each to aid deserving farm boys of South Carolina who have completed their high school work and meet other scholastic requirements to enter the freshman class for the session 1939-'40. The funds are to be available in equal installments at the beginning of each semester, but in order to be eligible to receive the second semester payment, a student must make a satisfactory scholastic record during the first semester. These scholarships are to be awarded through competitive examinations to be held at some central point in each of the congressional districts of the state.

To be eligible to compete for these scholarships, the boys must meet with the following requirements:

1. Contestants must be farm boys who have shown interest and achievement in agriculture through successful pursuit of projects in 4-H or F. F. A. Club work.
2. Their high school record must place them in the upper one-third of their graduating class.
3. They must be deserving and require financial assistance to attend college. Evidence as to moral character and personality will also be considered in accepting contestants for the examination.

Since the total expenses for a year at Clemson are approximately \$400.00, those competing for these scholarships must plan to meet the additional expenses required for completing a year's work.

Applications for admission must be filed on or before June the twentieth, 1939 as the district examinations will be held on July the twentieth. Candidates who meet the requirements for admission to the examination will be issued a card which must be presented at the time of the examination. The exact place and hour for the examination will be announced at the time the admission cards are issued.

Application blanks can be secured by addressing W. B. Aull as Chairman of the Scholarship Fund Committee, School of Agriculture, Clemson, South Carolina.

*Compliments of  
Clemson College Laundry*

## SUMMER SESSION

Alabama Polytechnic Institute

1939

First Term — June 5 - July 14

Second Term — July 17 - August 19

Standard Courses offered by all Divisions of the College—Liberal Arts, Engineering, Chemistry and Pharmacy, Architecture and Arts, Education, Home Economics, Agriculture, Veterinary Medicine, and Graduate School.

Summer program comprises the following:

1. Undergraduate courses on all levels from freshmen through senior.
2. Advanced undergraduate and graduate courses for persons who have finished two, three, or four years at teachers colleges.
3. Graduate courses in the various schools of the college with special emphasis on courses for: School superintendents, principals, and teachers.

Room and table board in excellent boarding houses at minimum prices. Cottages available for boarding clubs at actual cost.

Good library facilities and recreational opportunities

For further information write

ZEBULON JUDD

Director of Summer Session

Auburn, Alabama



## Clemson's Meats Laboratory

J. M. LAPHAM, '39

IN THE basement of one wing of the Long Agricultural Hall is the new meats laboratory of Clemson College which is designed for giving instruction to those students who are interested in the most up-to-date methods of killing farm animals and the cutting and curing of meats. The plant consists of a large killing room, two spacious chilling rooms, a freezing room, a meat-cutting demonstration room, and a sales room.

The killing room is equipped with a large scalding vat, with hot and cold water, scraping tables, meat cutting tables, automatic scales, and overhead tracks to convey the carcasses to different parts of the room and finally to the coolers or chilling rooms.

The coolers may be regulated at different temperatures suitable for the chilling of carcasses and the curing of meats. The freezing room is useful for preserving meats which have to be held over for a considerable length of time. The demonstration room is equipped with chairs where groups may be seated while demonstrations are in progress.

One of the finest things about the meats courses is that they do not stop with the demonstration. The students have a chance to put into practice what they learn as they actually do the killing, cutting, and curing. And, after this is done, they sell the meat to the local trade. The sales room is equipped with cutting tables, scales, and a large refrigerator which is of the show-case type. In this show-case the cuts of meats, sausage, etc., are displayed in an attractive way so that the customer may make his own selection.

The meats work is taught by Prof. R. R. Ritchie who has recently taken special training at the Iowa Agricultural College. The course is one of the most practical and popular courses at Clemson.

The meats laboratory does not serve the student body alone. Just recently an extension school was held at Clemson where the county agricultural agents and the assistant agents were given training. In this school instruction was given by K. F. Warner of the U. S. Department of Agriculture, Prof. Ritchie of Clemson College, and J. R. Hawkins, extension livestock specialist for South Carolina.

As the livestock industry continues to increase in South Carolina and the farmers line up with the "live-at-home" program, the fundamentals of butchering, meat cutting and curing will be of even greater importance than they are at the present time.

It is with pride that we call attention to this particular line of training which is helping Clemson students to equip themselves for their future work.

"Clemson Headquarters in Greenville"

## HEYWARD MAHON CO.

GREENVILLE

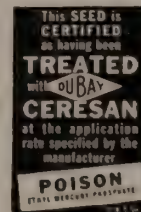
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# AGRARIAN PERSONALITIES

H. M. Covington—

*"Henry", "BB", "Hank" Covington, Advertsing Manager of "The Agrarian" . . . Scribe, Alpha Zeta . . . Phi Kappa Phi . . . Tiger Brotherhood . . . Vice President of the International Relations Club . . . President, The Dukes of Marlboro . . . Block C Club . . . Senior Platoon . . . Horticulture Club . . . Cadet Lt. Colonel . . . Plays bridge . . . Dances . . . Doesn't jitterbug . . . Hunts . . . Fishes . . . Reads Esquire . . . Boxes . . . Likes flowers and shrubs.*



H. K. Herlong—

*"Henry" Herlong, Agricultural Engineering Departmental Editor of "The Agrarian" . . . Vice President of the American Society of Agricultural Engineers . . . Alpha Zeta . . . Cadet Captain . . . Smokes cigarettes . . . Favorite sport, basketball . . . Prefers blondes . . . Pet hate a Jitterbug . . . Likes to read letters . . . Mechanically minded . . . Doodles.*



T. B. Ardis—

*"Red" Ardis, Agricultural Education Departmental Editor of "The Agrarian" . . . Alpha Tau Alpha . . . Grange . . . 4-H Club . . . Future Farmers of America . . . Phi Kappa Phi . . . 1st Lieutenant, Co. Exec. . . . Favorite sport, football . . . Smokes a pipe . . . Likes to shoot pool . . . Hobby, collects stamps . . . Plans to teach school.*





## THE AGRICULTURAL SOCIETY OF SOUTH CAROLINA

(Continued from page 3)

Society is interesting: "1825—John Mullooney, Esq. U. S. Consul at Tangier, Morocco sent many varieties of seed produced in that country for distribution to members of the Agricultural Society for which he made no charge and expects no reimbursements—but should the Agricultural Society of South Carolina wish to pay him a compliment they might forward him the below mentioned articles which would be rarities in Tangiers: 2 Venison Hams, 1 Pork Ham, The Smallest amount in cheese to show in opposition to English, a small quantity of Rice, A few Canteloupe and Watermelon Seed, A small quantity of Peach Brandy, which is not known in Tangiers."

We find in the minutes that in 1829 Thomas Jefferson addressed the Society on "The Cultivation of Olives and the Manufacture of Olive Oil." The orator for 1829 was Charles Cotesworth Pinckney, the subject of his address being a defense of the humanity of slavery as it existed in the South. The South Carolina novelist, poet and historian, William Gilmore Simms, addressed the Society on March 3rd, 1870, on "The Sense of the Beautiful." At the anniversary dinner of 1878, Dr. A. B. Rose, the President, closed his remarks with this toast: "The State of South Carolina: May her sons hereafter make their own bread, eat their own meal, wear their own home-made clothes, stand in their own shoes and marry her own daughters."

*Experimental Work*

When the society was founded it was evidently intended to establish a farm for agricultural experiments. In 1806 the Society netted a profit of \$3,451 by issuing a lottery for payment on their farm on Charleston Neck and erecting thereon certain necessary buildings, their intention being "to carry out experiments conducive to agriculture, horticulture and botany." (Lotteries were considered proper at this time.)

All through the early history of the Society are hints as to the establishment of an experiment station. Apparently these early plans were not carried out. In 1902 a small scale experimental station for low country products was established and made experiments with clover, field peas, millet, alfalfa and other crops.

At the Anniversary Meeting in 1906 the Agricultural Committee reported that they had been in correspondence with Clemson College endeavoring to secure the establishment of an Experimental Farm at some point in the lower coastal plain, which would be of great value to the agricultural interests of the low country.

At the 1907 Anniversary Meeting the Agricul-

tural Committee reported that they had been earnestly following up this project and that the Southern Railway would give to the Society 200 acres near Summerville. The tract was carefully examined, but the Clemson authorities declined to receive it on account of the cost of drainage. The committee thought the necessity of drainage a good feature knowing that this would show what could be done with a piece of land typical of vast areas of the low country. Leaders in the Society succeeded in getting the experimental farm established.

At the 1908 meeting the committee reported that the land had been accepted and that The Drainland Experimental Station, as it was called, was being operated under the direction of Clemson College. Since then it has been added to so that it now consists of 400 acres. For a number of years the Society met there annually with the Board of Clemson College where agricultural addresses were made and the Society served dinner.

The Society supported the establishment of the James Island Experimental Station, one member offering as much of his land as would be needed to experiment with sea island cotton. The Society has always been on the alert as to the benefits resulting from experimenting in various lines of agriculture some members having started experimenting with vineyards and wine making as early as 1798.

Prizes and premiums have been offered by the Society for the production of high yields in a number of crops including corn, hay and tomatoes as well as livestock. There is a cup in Washington, D. C., presented to George Washington in 1785 by the Society for raising the largest jackass.

Upon developing floral fairs and industrial exhibitions, the members decided that a society hall was a necessity. The money was raised by issuing bonds and by donations and the hall was erected on Meeting Street. Following the earthquake in 1886, the hall was used as a city hospital for more than a year. When the Industrial Exhibitions were discontinued in 1888, the hall was rented for an opera house and was so used until January 1, 1894, when it was entirely destroyed by fire.

Besides the innumerable projects by which the Society has helped agriculture, it has been active in promoting many municipal projects not directly related to agriculture. The Society has always been interested in "Good Roads" and "Drainage" and therefore closely associated with the Sanitary & Drainage Commission of Charleston. A former president of the Society was also chairman of the Sanitary Drainage Commission and did much to bring about a highway system that covers Charleston County and the State. The Society succeeded in getting legislation passed which was very helpful



## THE AGRICULTURAL SOCIETY OF SOUTH CAROLINA

(Continued from page 30)

to the fish and oyster industry. Members of the Society have been asked to attend important conferences as delegates in discussing government programs for agriculture and land settlement.

Among the Society's many benevolent projects is an annual four year scholarship to Clemson College awarded to the most deserving boy from Charleston County desiring to study agriculture.



Cut Here

Notice! Farm Managers, Agri. Teachers, County Agents, F. S. A., S. C. S., and others Agriculturists!

You can complete a course at

## CLEMSON COLLEGE SUMMER SCHOOL

in three or six weeks

Specialists teach the following:

- ☐ Cooperative Efforts in Agri. (1)\* (2)\*
- ☐ Tobacco Production (1)
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- ☐ Philosophy of Vocational Education (1)
- ☐ Vocational Guidance (3)
- ☐ Gas and Electric Welding (3)
- ☐ Cotton Classing (June 19-July 14)

(1)\*—June 12-30; (2)—July 3-22; (3)—June 12-July 22. Many other courses for various groups.

I am interested in courses checked. ✓  
Send catalog and full information.

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Mail to:

**W. H. WASHINGTON, Dean,**  
Clemson College Summer School,  
Clemson, S. C.

Cut Here

## ROTHERWOOD FARM

(Continued from page 4)

out of Bowlina's Pet 742278, has twelve daughters averaging 636.19 lbs. butterfat; 12,075 lbs. milk; ave. 5.27 per cent.

The herd is exhibited at four major Tennessee shows each year and occasionally at other large state fairs.

The barn, modern in all respects, is brightly decorated with prize ribbons and medals won by the herd. Over the door is the slogan "EACH COW PAYS HER WAY," which is indicative of the high ideals of the breeder.

The milk from the herd is made available to the citizens of Kingsport as grade A Raw through the cooperation of a local distributor.

Mr. George A. LaFever, who has been in direct contact with Jersey cattle since he was fifteen, was selected by the owner to take complete charge of the herd and develop it along the lines of true type. A graduate of Massachusetts Agricultural College at Amherst, he is a man who studies cattle carefully and strives to go forward, making each generation just a little better by following scientific practices as they are presented in behalf of herd advancement. His success is attributed largely to the adage—"Honesty is the best policy." With untiring hands, Mr. LaFever works with the herd as if it were his own.

In the interest of better Jerseys, Mr. LaFever attends all of the meetings and cattle shows which it is possible for him to attend. He is considered one of the best judges in the American Jersey Cattle Club and is rated by the leading dairymen as one of the top three Jersey Herdsmen in the United States. Under the supervision of Mr. LaFever the herd won the Constructive Breeders Registry award for a second time, which is indeed a rare distinction. The plan of the manager and the owner of the herd is to advance the high standards of the herd; in doing so they keep the animals on test at all times.

No account of the Rotherwood Farm is complete without a tribute to Mrs. LaFever, wife of the manager. Besides carrying on the duties of the household, she assists her husband in his office and acts as a hostess to all visitors to the dairy. She willingly assists in giving information concerning the herd to anyone who might visit the dairy. In the LaFever home there is a cordial welcome to all visitors and an assurance of most delightful entertainment.



## MATCHING INDUSTRY'S PROGRESS

(Continued from page 7)

the structure of these new political subdivisions the rights of the states, the freedom of individual action, and the processes of democracy are preserved.

Such an organization provides the machinery whereby our State Colleges, Experiment Stations, Extension Services, the U. S. Department of Agriculture and other agencies can make available to large groups of farmers, with an efficiency comparable to industry's mass production methods, the latest developments in agricultural knowledge. Specialists in every field of agriculture, working together toward the broad objectives outlined in the district program and following detailed methods set up by local supervisors in the district work plan, are available to provide technical assistance to farmers in organized districts.

The farmer himself, who has been at a disadvantage as an individual buying from and selling to organized groups, can through cooperative action obtain the benefits of wholesale operation. We are only beginning to visualize the possibilities of cooperative action in the purchase of farm materials, development of markets for farm products, production of planting stock and seed, development of recreational facilities, and other opportunities for community achievement.

In the district organization, it seems to me, we have the framework for remodelling agriculture to meet the complex requirements of modern civilization. We have only to look about us at the land to visualize the difficulties of our task. But it is not too late to realize the great natural advantage of this Southern Piedmont Region and to build an agricultural structure to match the sturdy edifice of industry.

I consider this a challenge as great as that which faced our forefathers in an unbroken wilderness. They had their eyes focused on building a nation and they did well the job of pioneers. We cannot blame them greatly if they failed to see the destruction they wrought to the land. But we can read the future in our streams. We can see the warning in our gullied hillsides. And future generations will not hold us blameless if we fail to meet the new challenge of a modern age.

## Bodiford's Dry Cleaners

Phone 78W

H. O. BODIFORD, Owner

Clemson, S. C.

### A CORRECTION

We wish to acknowledge here the mistake we made in the last issue of giving Dr. B. O. Williams as the author of the article, "Farm Tenancy." Dr. G. H. Aull was the author. We offer our apologies.

## COMPLIMENTS OF THE DAIRY DEPARTMENT CLEMSON COLLEGE

## CLEMSON COLLEGE ROAD- SIDE MARKET

Open April 15th to December 15th

We sell 115 varieties of peaches, 75 varieties of apples, and many varieties of grapes, plums, cherries, raspberries, dewberries, pecans, etc. Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

The Horticultural Department, C. A. C.

## THE SOIL ACIDITY PROBLEM IN SOUTH CAROLINA

(Continued from page 8)

the saw timber. Often much valuable wood is left to stated: "It is recognized that South Carolina can no longer depend solely upon cotton and tobacco as the foundation on which to build a strong and permanent civilization. A more deversified system of agriculture is needed, including a wide variety of high grade feed crops necessary in the successful production of farm animals."

We have lagged behind in South Carolina in the production of grass and hay crops, which is in turn responsible for the lag in livestock production. It is for this reason that we have concentrated our attention on such row crops as cotton, tobacco and corn, which permit serious soil erosion. Since these crops put nothing back into the soil, we therefore use heavily of fertilizer. This excessive use of fertilizer is responsible for the very high acid condition of the soil. Now if we will use lime to correct this acidity, we can begin to grow more soil conserving and soil building crops, and thus construct a foundation to support a livestock program necessary for a live-at-home program.

Now, it so happens that lime is cheap and one application lasts for several years. There is no reason, then, why the farmers of South Carolina and of the South cannot go ahead with this program of liming the soil, not only for their immediate benefit but for the benefit of posterity as well.

The whole situation can be compared to a simple case of acid indigestion. In such a case the person suffering takes a dose of soda, which has the same effect in neutralizing acid as does lime, and thus clears up the trouble. With such a simple remedy possible and with such wonderful results, South Carolina farmers should make every effort to cooperate with Dr. Cooper in making the correction of this problem realized.

South Carolina farmers, lets rid our state of the one crop system; lets cure our soils of acid indigestion.

## OUR SOUTH CAROLINA FORESTS

(Continued from page 24)

rot after a sawmill has been through a forest and a great quantity of cord wood for sale and for home use can be cut out of the tops and limbs of this debris.

Reforestation will soon become widespread in South Carolina since farmers are beginning to see the importance of forests as a profitable crop. They will put all easily gullied land and land that is not fit to grow field crops in trees and thus learn how to operate a woodland for profit.

## THE SOUTH CAROLINA NATIONAL BANK

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## ..... *Before We Go* .....

The year is gone and we, the executive staff and departmental editors, are happy to say that we had the pleasure of inaugurating THE AGRARIAN as the official student publication of the school of agriculture and the department of agricultural education. At this time, in behalf of the staff, I would like to make certain acknowledgments "Before We Go."

It is with great pleasure that we look back on our association with the advisory board composed of Dr. B. O. Williams, Dean W. H. Washington, and Professor B. E. Goodale. It was their job to supervise the work of the magazine both the business and editorial ends. They worked hard in order to keep THE AGRARIAN running on a business basis and keeping its standards high as was outlined by the faculty at the beginning of the year. They were always ready to contribute to its make-up and at the same time make constructive criticism. From these contributions it is quite obvious that the advisory board was one of the main reasons why THE AGRARIAN made the progress that it did.

To our advertisers—They were a loyal group who gave us financial assistance. Without them it would have been impossible to have presented THE AGRARIAN as it is financed solely by advertisements. So to this set of "Backers" it is with deep appreciation that we thank you for your support and sincerely hope that your advertising with us has proven to be a financial asset.

At the beginning we decided to establish THE AGRARIAN on a firm foundation, so we needed someone to keep our records and supervise the business end of the magazine. With this in mind we contacted Mr. J. C. Littlejohn, College Business Manager, who kindly consented to handle THE AGRARIAN'S business. With an efficient staff and his valuable aid both financially and advisory we disposed of the business in a business-like manner.

Next, we would like to pay tribute to THE TIGER and TAPS, newspaper and annual of the college. From these organizations much material was loaned to THE AGRARIAN. THE TIGER was always ready to give the magazine any publicity that would help to advertise it. This was indeed a help because a new publication as THE AGRARIAN was at that time needed some advertising and THE TIGER was a very good medium, so with deep respect to these two fine publications

we are happy to say that they had a part in the making.

Another group which we wish to thank is our printers. The majority of the staff were new in the magazine business so naturally many mistakes would have been made if it were not for our printers aiding us in the arrangement and make-up. We are happy to say that our association with the printers has been a pleasant one and we sincerely hope that we will have the pleasure of working with them again.

And lastly, we come to the junior staff. It is with much appreciation that we commend you for the first time. You worked hard in an effort to prepare yourselves for the task that you are about to set out upon. We feel sure that with the knowledge gained by our mistakes and after a year's apprenticeship you will continue THE AGRARIAN gradually increasing its size and quality. Now with these acknowledgments the retiring staff steps aside leaving it to the incoming staff to "Carry-on."

HARRIS L. BEACH

Retiring Editor

---

### SLAVES

T. E. GOODSON, '40

Parade! Parade! The beating feet  
Of marching men an eon old!  
A thousand eyes take in the sight,  
Perceiving nought of what is told.

A thousand cheers rise up in praise  
To drown the cries of those long lost,  
And blind the victims doomed to pay  
For what tomorrow's war will cost.

Oh God, how long a time to know  
That fire still burns when fed,  
To know the terror of it all  
Before these marching ones are dead?

The glitter of an army's might  
Still flashes 'cross the human face,  
And leaves each time a deeper scar  
That time itself cannot erase.

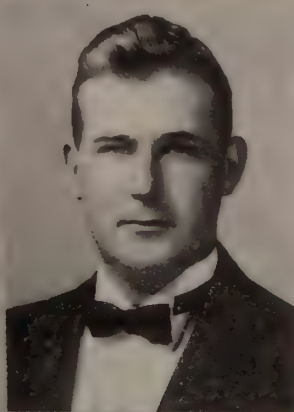
Erase it? No, but cover it  
With greed and resurrected pride,  
Then watch the children once again  
Approach the hungry, surging tide.



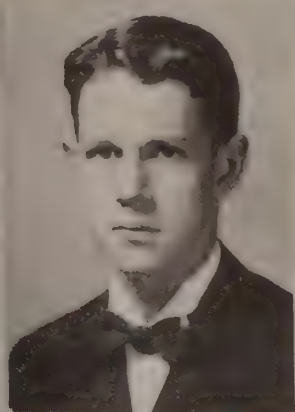
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MANAGING EDITOR



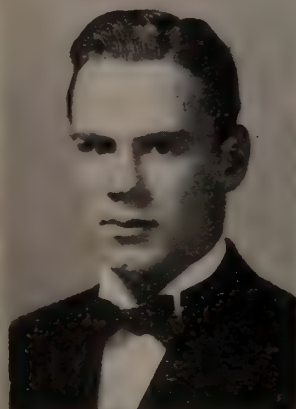
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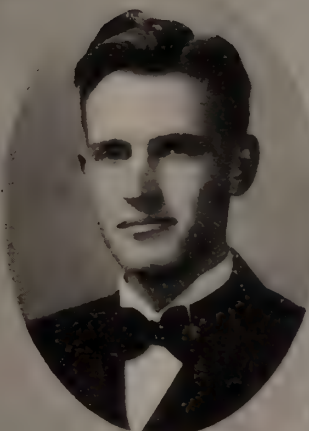


J.D. WATSON  
CIRCULATION MANAGER

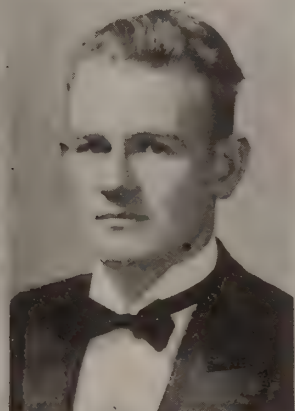


C.M. AULL  
AGRICULTURAL ECONOMICS

# THE RETIRING STAFF



H. L. BEACH  
EDITOR-IN-CHIEF



E.C. STURGIS  
ZOOLOGY & ENTOMOLOGY



T.B. ARDIS  
AGRICULTURAL EDUCATION

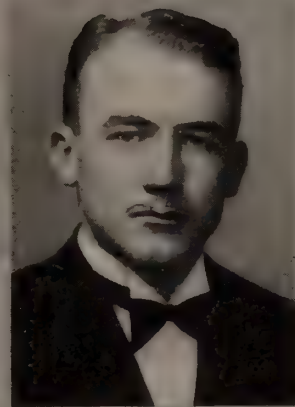


C.C. MILEY  
HORTICULTURE

1939



H.K. HERLONG  
AGRICULTURAL ENGINEERING



J.L. SHEALY  
AGRONOMY



J.M. LYNES  
ANIMAL HUSBANDRY



L.M. RHODES  
DAIRYING



# NV POTASH

## *Pays!*

TRADE MARK REGISTERED

### *for* **TOBACCO**

Plenty of **NV POTASH** in your fertilizer reduces wastage, improves the body, makes smoother leaves, reduces diseases and produces bigger yields of better quality which bring better prices. Tobacco is a potash-loving crop, removing from the soil more potash than both nitrogen and phosphoric acid combined.

### *for* **POTATOES**

Plenty of **NV POTASH** in your fertilizer produces smooth, chunky, uniform No. 1 potatoes of better color and more even maturity. Potash-fed potatoes are more compact, better developed, thicker, shorter and wider—they have a high starch and low protein content, making them white, mealy and palatable when cooked.

### *for* **TOMATOES**

Plenty of **NV POTASH** in your fertilizer greatly increases the yield of No. 1 tomatoes and reduces the cat-faces, puffs, culls and small, poorly-colored fruits. It keeps tomato plants vigorous and productive, helps them to resist disease and adverse weather, reduces cracking around the stems of the fruit, increases the percentage of good, red color and thickens the walls, making the fruit firm, well-filled-out and meaty.

### *for* **COTTON**

Plenty of **NV POTASH** in your fertilizer **PREVENTS RUST**, helps control Wilt and produces vigorous, healthy plants with less shedding, larger bolls that are easier to pick and better yields of uniform, high-quality lint.

### *for* **VEGETABLES**

Plenty of **NV POTASH** in your fertilizer produces bigger yields of the No. 1 grades that bring top prices—vegetables that are uniform in size, shape, color, texture and flavor. Potash-fed crops stand up under shipping and reach the market fresh, bright and firm. Potash is the quality builder. Remember, the average truck crop removes from the soil more potash than both nitrogen and phosphoric acid combined.

### *for* **ORCHARDS**

Plenty of **NV POTASH** in your fertilizer increases the yield of high-quality fruit and improves the foliage and tree vigor of your orchard. Potash-fed trees resist disease and winter injury and produce fruit of better size and color and better keeping quality. Fruit trees, like general crops, need balanced fertilizer to produce good yields year after year.



*YOUR FERTILIZER MAN will be glad to supply you with a mixture well balanced with plenty of **NV POTASH** that will increase the yields and improve the quality of your crops. Use **NV POTASH**—It Pays!*

**N. V. POTASH EXPORT MY., Inc., Hurt Bldg., ATLANTA**

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Clemson College — South Carolina



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PRINTERS

GREENVILLE, SOUTH CAROLINA



CLEMSON COLLEGE LIBRARY

# ELECTRIC SERVICE and THE SOUTHERN FARMER



The rapid extension of electric service to farm communities, made possible through the increased number of uses for electric service in the home and on the farm, is bringing a new day of opportunity to Southern farm families.

Electric service may be used not only to the *convenience* and *comfort*, but to the *profit* of the dairyman, the poultryman, the livestock raiser, the plant grower, fruit grower, and the trucker. And it just happens that these are the farming operations to which our farmers, faced with drastic curtailments of tobacco and cotton acreages, may most logically turn for increased income and purchasing power.

Only a few years ago electric refrigeration equipment, sterilizers and water heaters for dairies were unheard of. No one thought of using lights and water warmers and electric brooders for poultry. Electric hotbeds for plant growers, florists and truckers were naught but a dream, if that.

Today, dairies are using not only refrigeration equipment, but electric sterilizers, water heaters, feed grinders and water systems, and saving and making money by doing so.

Poultrymen are finding it profitable to use electric brooders, feed mills, and, in winter, electric lights and electric water warmers.

Plant growers and truckers are using electric service profitably for electric hot beds, for curing potatoes and for other operations. (Experts of the South Carolina Extension Service estimate that the farmers of that state can increase their income on sweet potatoes almost by \$2,000,000 a year through the use of electric service.)

The Duke Power Company is pleased to be able to make so important a contribution to the well being of the farmers of the area it serves during this period of revolution in the agricultural policy of this section.

---

## DUKE POWER COMPANY

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# The Agrarian

OFFICIAL STUDENT PUBLICATION

VOL. 2



NO. 1

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Dr. Coker (left) and Mr. J. F. Clyburn examine a plot of the famous "Coker 100"

## DAVID R. COKER, Leader of Southern Agriculture

*. . . . His work, a milestone in the progress of Southern agriculture, Dr. Coker, scientist, farmer and plant breeder, was the Gregor Mendel of his day.*

*By J. M. BAKER, '40*

**P**ROBABLY no one has done as much toward the advancement of Southern agriculture since the days of Thomas Green Clemson as has the late David R. Coker of Hartsville, S. C. He was a farmer, scientist, and a practical plant breeder and he gave the bulk of his life to the improvement of farm conditions.

Mr. Coker was born on November 20, 1879 and after taking preparatory study at Hartsville and Society Hill, he entered the University of South Carolina, graduating there with an A. B. degree in 1891. Mr. Coker always believed that the only way in which Southern agriculture could be improved was by applying scientific information to practical farm problems. From the very beginning he was primarily interested in Scientific plant breeding, and in this line of

work Mr. Coker undoubtedly found his calling because of the great success that he made as a practical plant breeder.

Mr. Coker first began plant breeding work in 1902, and by exercising the utmost patience, ingenuity and originality he developed one of the most efficient experiment stations in the South at his Hartsville, South Carolina plantation. At the beginning of his plant breeding work Mr. Coker said: "Scrub methods, scrub stock, and scrub seed are the Southern farmers' worst trouble", and this philosophy was certainly reflected throughout his life's work.

One of the main features that set Mr. Coker off from others in his field was the fact that he was a man of extraordinary wide vision. Long

*Continued on page twenty-seven*



# The Farmer Faces The Tariff

*. . . Thought by many to bring prosperity to our people, high protective tariffs burden the farmer and lead to depressions.*

By B. W. ANDERSON, '41

TWENTY-SEVEN years after Hamilton's financial program incorporated the first tariff for revenue, came one for the avowed purpose of protection. Conceived in war and passed during an era of frenzied Nationalism, the protective theory was to become the focal point of contention in American political history—even to the present day. The industrial infant soon became a political giant. The protective tariff of 1816 was a concession of the then dominant agricultural interest, it was claimed a temporary measure, but in the name of national unity and welfare the farmer sold his birth right. In 1818 the protective tariff was extended. A further increase followed in 1824 and 1828 and all the political strength that the Agricultural South and West could muster could not stem the congressional graft and deception which our tariff-subsidized industries freely employed.

In desperation South Carolina threatened secession 1828. It was not until 1842, however, that John C. Calhoun so ably stated the case of broken faith when he charged that the government had, "descended from its high appointed duty, and become an agent of a portion of the community to extort under guise of protection, tribute from the rest of the community, and thus defeat the end of its institution, by converting powers, intended for the protection of all, into the means of appressing one portion for the benefit of another."

Since Calhoun's speech, nearly a century of protection has passed, and for no extended time has the stifling economy on agriculture been relented. Long periods of high protective tariff have alternated with shorter periods of "tariff for revenue." In all periods of the latter, agriculture has been immediately responsive, and recovery has been evident.

And why does the American farmer suffer in a protective American economy? Loss of foreign markets is the obvious answer. Resorting to a period of self-sufficiency in the era of colonization, America was soon to learn that her economic development must be founded on the capitalization of her greatest natural resources—extensive, productive agricultural land. The

exportation of tobacco, grain, and meat from the middle Atlantic Colonies to the West Indies was the beginning of a lucrative trade which was to establish the American farmer as the world's foremost producer of food and raw material. To the list of exports indigo, rice, cotton, and various meat products were added, and the American farmer, under free trade, enjoyed the patronage of every industrial center and a monopoly in production—for few nations approached our comparative advantage.

But nations, or individuals, can't buy if they can't sell, and, conversely, no nation can sell if it doesn't buy. Tariff is, therefore, an artificially created barrier standing between the American farmer and his buyers. Theoretically neither party should gain or lose in trade, but tariff to the customer amounts to a premium paid by foreigners for the privilege of American trade.

Through a hundred years of protection the American farmer held to his world wide market by shouldering the tariff himself. The price of exported produce was necessarily lowered to the point where the tariff on imports was set off by the advantage in prices which the farmer granted at the cost of soil fertility, slavery, a lowered standard of living, etc. The unprecedented high tariffs of the 1920's left America without a market at a time when she was geared to her highest production ratio. It was the high tariff which caused Secretary Henry A. Wallace to state in "New Frontiers" PP 43-44 "If the full truth were ever known about the way in which government influence had been used by great corporations, public indignation would know no bounds. Such legalized thievery (the tariff) is probably working more harm to the people of the United States than all other forms of robbery put together."

Even though the American farmer is in what you might call a "tight spot" at the present time because of the tariff, there is, however, one consolation that he has to rely on, and that is reciprocal trade pacts. This would mean that each country give concession on products it is eager to sell.

# Cokesbury Conference Institute

*. . . . A torch-bearer in the field of education in the Old South, and a pioneer in the cultural and religious development of South Carolina.*

*By B. R. LEONARD, '42*

If measured by high Christian idealism and lasting impressions, it would be hard to find a school with a more illustrious career than the Cokesbury Conference Institute of Cokesbury, Greenwood County, South Carolina. Its reputation is not widespread; few laymen today can recount its history and in time to come even the name may pass into oblivion, for we of a dynamic society are prone to forget things of material insignificance. But former students in every walk of life cherish its memory, and one no less than the late Bishop Holland McTyeire, founder of Vanderbilt University, spoke of Cokesbury with a devotion and enthusiasm commanded by no other school.

Cokesbury Institute's embryonic history is poorly recorded. Only the milestones in its relatively rapid ascension to prominence in South Carolina's sectarian education, find place in the autobiographies of alumni and sponsors. The indifference of the early slave-holding planters to education retarded the development of schools here, as it did in many parts of the old South, but schools eventually came largely through the inspired efforts of the church. Certainly, is this true of the Cokesbury community; the history of the institute and old Tabernacle church is one. The church was organized prior to 1788, and a crude log cabin school was built on the church property shortly thereafter. Little is known of the school before 1820, but in this inauspicious beginning was the framework of an institution which increased in spiritual and material assets, annually, until discontinuance in 1918.

Success and continual development of the Old Tabernacle School was not brought about by chance, for many men of unusual gift and talent resided in this community. The name of one Mr. Doolittle, a New Englander by birth and an artist of some ability, stands out among the earliest teachers. It is, however, to Stephen Olin, Doolittle's successor, that the school owes its greatest prominence.

New quarters for the church and school were built in 1820. An advertisement for a



The Old Cokesbury School

teacher brought Olin, a graduate of Middleburg College in Vermont and an aspirant to a great law career, but a man of broken health. Seeking employment and health in the South, he came to the school as a teacher in 1821, but little did he or anyone else realize his destiny. Soon after assuming his position he chanced to overhear an inquiry, "Does the new teacher open school with prayer?" Believing that he was expected to do so, he wrote prayers very carefully, read the Bible and made comments on the scripture. The scripture study soon led to self-conversion, and many pupils, moved by his chapel talks, were converted to Methodism. The idea of further law study was superseded by the conviction that God had other plans, and Stephen Olin, lawyer, became Dr. Olin, minister and teacher, to lead the Tabernacle school to a reputation of thoroughness in scholarship and spirituality in

*Continued on page twenty-six*



# Santee-Cooper Power and Navigation Project

*... Furnishing power for industries, provision for playgrounds, provision for cheaper transportation and flood control, Santee-Cooper is a project for the benefit of the people of South Carolina.*

By R. C. WANNAMAKER, '40

THE beginning of the Santee-Cooper Project dates back some hundred and fifty years ago when Charleston business men began to think realistically of an inland water route between the coast and the interior. In 1793 work was begun on the old Santee Canal, and the first boat passed through it in 1800. This twenty-two mile canal cost about \$800,000 to construct. The canal was used extensively (in the transportation of cotton, mainly) until the era of the railroad came along, and then all the traffic of the Canal was lost to the rails.

Then, about twenty-five years ago, the difference in elevation of the Santee and Cooper rivers (there is a fall of 45 feet between them) began to attract the attention of hydraulic and electrical engineers toward a power development in the Pinopolis Basin. This idea was the subject of much discussion, and a number of attempts to carry it out were made over the period of years from 1928 to 1938. In 1933 the Project was taken up as a public development, and a plan was formulated and forwarded to Washington for consideration. The South Carolina Public Service Authority was created the following year, and President Roosevelt in a letter to Senator James F. Byrnes informally approved the project. The Project, however, was bitterly fought by interested private power companies, but in May, 1938 the U. S. Supreme Court upheld an opinion of the late Judge J. Lyles Glenn, of Chester, S. C., approving the Project. Work was begun on the development shortly after this decision was issued to the Authority.

To give the reader some conception of the actual physical features of the Project: It is situated in the Coastal Plain section of South Carolina and lies in parts of five counties—Berkeley, Calhoun, Orangeburg, Sumter, and Clarendon. The drainage area is approximately 15,000 square miles, and two large reservoirs

will be formed by the construction of dams across the Santee River and the Pinopolis Basin, the former covering an area of about 155 square miles with a maximum depth of 35 feet, and the latter covering an area of about 95 square miles with a maximum depth of 65 feet. The conversion and connection canal between them will have a mean bottom width of 200 feet and a minimum depth of water of at least 10 feet. This will serve both as a navigation channel and to supply water necessary for power facilities at the Pinopolis power house.

The Santee diversion dam across the Santee River will be about eight miles long, consisting of a spillway about 3400 feet long, a pump-sand filled portion about 2300 feet long on the north side of the river, and a rolled earth fill about 16,000 feet long on the south side of the river.

The Pinopolis dam will be about 2 miles long, and will be made up of two earth-filled sections totalling about 10,000 feet in length, between which will be constructed a reinforced concrete power station and navigation locks. About 26 miles of earth dykes will also be constructed around the Pinopolis reservoir to properly confine the lake waters and prevent formation of pools along the shallow areas of the shore line.

The Act creating the Project went beyond the original utilitarian purposes of power generation and of navigation. It was made a definite condition that its authorization is "in all respects for the benefit of all the people of South Carolina" and "for the improvement of their health and welfare and material prosperity." This authorization and these qualifying conditions are inherent and inseparable. The Project's administration is governed by, and must adhere to them absolutely. This eliminates the possibility of private gain and makes definite the broad essentials of the Project—ITS OPER-

## ATION FOR THE BENEFITS OF ALL THE PEOPLE.

The special objectives which the Authority expects to attain upon completion of the Project are: (1) Stimulation of industrial development of the Coastal Plain for the taking up of the economic slack caused by the agricultural depression there. (2) Provision for deepening the inland waterway between Charleston and Columbia, and Charleston and Camden and, thereby, probably causing a reduction in rail freight rates to and from interior towns and cities. (3) Provision for flood control which will include the reclamation of thousands of acres of alluvial bottom lands. (4) More sanitary and healthful conditions in the Coastal Plain through malarial control and through improvements (environmental and otherwise) which affects the welfare of the people. (5) Provision for a playground with extensive recreational facilities through the creation of two large lakes available for boating, fishing and hunting. (6) Reforestation of large areas in the basin and adjacent territory.

### Will Provide Incentive And Furnish Power for New Industries

Primarily inclusive in the objectives of the Project is the industrialization of the Low Country as a balance to agriculture. This can be done since all of the elements needed are at hand—adequate local and world transportation, plentiful raw materials, mild climate, abundant labor, and low priced power. Within a radius of 100 miles of Pinopolis there are enormous undeveloped plant and mineral resources, and this supply of raw materials will encourage the building up of great chemo-electrical, thermo-electrical and wood working industries. Should there be built in this area just one plant for finishing each of the various products which may be processed from these mineral and plant resources, there would be needed something like one billion, one hundred million kilowatt hours of prime power each year. Some of the industries and manufacturing enterprises which may be established upon the completion of the Pinopolis power plant are: cement plants, calcium carbide plants, cyanamid plants, phosphoric acid plants, carborundum plants, newsprint mills, furniture and woodworking plants, Kraft paper mills, tobacco factories, canneries, refrigeration plants, textile mills, and a peat plant for production of ammonia—potential industrial units with a huge annual power consumption, and which would



View from West Dam Overlooking  
Powerhouse Site to East Dam

\*Courtesy S. C. Public Service Authority

produce so many things our people need and cannot purchase now because of high prices resulting from costs of shipping from afar. The South Carolina Public Service Authority (administrator of the Project) says that, when the Project is completed, the power generated at the Pinopolis power plant will be made available to the people of South Carolina at the lowest rates ever to be quoted in this region.

### Adverse Criticism Answered

Critics of the Project who say that the demand for power in this state is not sufficient to warrant this huge development have been answered by Dr. Clark Foreman, Director of PWA's Power Division, thusly: "That has been said about every single power project built under this administration. It has proven untrue in each instance. People still say it in the face of all experience . . . Go to TVA where they are producing more energy than will be produced here. The same thing was said there, and now they have a greater demand than they can supply. TIME magazine of November 6, 1939, in an article on the power consumption of industry says: . . . . "Another reason for the need of new generating capacity is the relatively small recent investment in utilities plants. In 1929 the utilities invested over \$900,000,000 in new plants, topping a six-year average of about \$800,000,000. The depression practically stopped all utility investment, and in 1937 new utility investments (exclusive of TVA and other government spending) recovered to only \$450,000,000. One reason for expanding power sales is that today every installation by industry of high-powered modern machinery adds huge wholesale loads to electricity consumption. With a possible boom at hand and more than half of the machinery still well over ten years old (and not using as much

*Continued on page twenty-eight*



# The History of Condensed Milk

By H. A. JOHNSON, '40

CONDENSED MILK is the child of the nineteenth century. It has had a rapid development in contrast to the long history of cheese and butter, and it occupies an important place in the dairy industry.

Appert, a French research worker, found, as early as 1810, that milk could be condensed and preserved by the use of heat. Milk tablets were made by him in 1811. The vacuum pan, which is so important today in the condensation of milk without exposure to air, was invented by Edward C. Howard, an Englishman. A patent was issued for this apparatus in 1813. It was first adapted to milk by William Newton, who received a patent for his preservation process of milk in England, 1835. It remained for Gail Borden, however, to first successfully initiate the manufacture of condensed milk in commercial quantities. He was truly the inventor of the process of milk condensing which started that great and successful industry which we know today. He is said to have experimented for ten years before he finally decided that a semi-fluid state produced by the removal of water would be the best way to preserve milk. Borden applied for a patent in 1853, but it was three years before the Patent Office saw enough originality in his discovery to grant the patent. In his application Mr. Borden said:

"I am aware that sugar and various extracts have been and are now concentrated in vacuo under a low degree of heat, to prevent discoloration or burning. I do not claim concentrating milk in a vacuum pan for such a purpose, my object being to exclude the air from the beginning of the process to the end to prevent incipient decomposition. This is important, and I claim the discovery."

Evaporated milk, as unsweetened condensed milk is called, has been a great boon to the civilization of mankind. It has gone many places—from the tropics of West Africa to the South Pole with Admiral Byrd. It has lent itself to the adverse conditions of adventurers' travels and exploring parties, because it possesses those characteristics which men are looking for in a food, whether it be a necessity or a banquet. In 1904, 110,000,000 pounds of milk was used in the evaporated form in the United States. In 1931 1,400,000,000 pounds of evaporated milk were

consumed by the people of this country. These figures in themselves are the history of the American housewife's discovery of an inexpensive, convenient whole milk supply.

The War between the States was one of the factors which gave the evaporated and condensed milk industries one of the greatest boosts any new industry could hope to get. It was the beginning of the realization of the necessity for cleanliness and the armies of both sides were demanding canned milk. The nation was setting a new pace. Railroads were opened in the Western Territory. Farming in the west caused the poorer lands of New England to be abandoned, and the farmers moved to the cities. Between 1880 and 1890, the population of the nation increased by twelve million. The great cities of the machine age had begun. Families were now close together. There were great, roaring factories and large cities where there had formerly been a small urban community. No longer could the farmer peddle his goods, nor could the city dweller find time to go to the farm to buy things from him. Hence it was that the small original milk evaporating plants suddenly found themselves growing into immense corporations. By 1914, evaporated milk had reached such heights of popularity that 10 million cases were produced that year. That was of little significance in comparison to what happened during the First World War. Millions and millions of pounds of evaporated milk were exported from America to the allied armies and even more millions to the civilian populations of England, France, and Belgium. So many of their cattle were slaughtered during the war that even after the armistice, great quantities continued to be shipped to these countries, as well as to Germany and Austria.

Certainly, evaporated milk has placed within the reach of everyone a safe, dependable milk supply with the advantages of low cost, digestibility, and improvement in quality of food consumed by many, plus the advantage of not having to keep the milk refrigerated before use. The can of milk as we know it and purchase it from our grocer is a symbol of achievement in the handling of food so as to meet the peculiar and exacting requirements of life of civilized man as it exists at the present time.

# Eating Your Cake and Having It Too

By BURNET R. MAYBANK,  
*Governor of South Carolina*

## GUEST EDITORIAL

**T**HE PERIOD, just prior to the last Great War, was not the most prosperous in American history nor yet the most depressed. This period is noteworthy in that during it agriculture and industry were generally "in balance," and prices which were received by producers in each of these great fields were commensurate with prices which they paid for commodities used in production. The war, however, had a disturbing influence both on prices paid and prices received. For four years beginning about 1916, farmers received relatively more for their cotton, grain, eggs, meat, butter, etc., than they were required to pay for farm machinery, fertilizer, equipment, hired labor, etc., so that agriculture was generally prosperous, and many people were led to believe that a new era had dawned on the farm. There was a great rush to plow up every available acre and to buy more land with which to produce more high-price farm commodities. The price of land, too, was greatly increased, and in 1920 South Carolina farm real estate was selling, on the average, for nearly two and one-half times its 1909-1914 price.

Since 1921 there has not been one single year when a farmer could take his produce to market and exchange it for as much of the things he needed as was true, on the average, during the period just before and just after the war. The reasons for this are complex and not readily understood. It is significant, however, that during the recent depression, industrial production declined nearly 50 per cent and industrial prices about 25 per cent, while farm production remained practically stationary, and farm prices fell 55 per cent.

The farmer simply cannot readily adjust his production to demand and is, therefore, the loser in practically every dislocation of prices. This being true, it would seem to be the part of wisdom for every farmer to make himself as independent of price changes as possible by produc-

ing on his own farm a maximum of his own requirements. This does not necessarily mean subsistence farming. It does mean, however, a determination to avoid the ruinous practice of exchanging a dollar's worth of farm produce for eighty cents worth of the commodities commonly used in production.

The farmers of South Carolina, as a result of the research, teaching, and extension activities of Clemson College, and of the United States Department of Agriculture, have made great strides along these lines and will not easily be turned aside by temporary price advantages which might follow the present European struggle. As a matter of fact, because of present surpluses of most agricultural commodities, it is unlikely that farm prices will advance anything like as rapidly as during the last war, if at all. Be this as it may, however, farmers are urged to hold fast to the gains which they have made, to guard against excessively high costs and expenditures for any purpose, and to utilize such gains as might be made for the payment of existing obligations and the improvement of present standards of living. In this way farmers may eat their cake and have it too, since freedom from debt, lower interest charges and reduced costs of production together with such material and cultural advantages as can be afforded, themselves tend toward a happier and a more prosperous life.

In conclusion, it is the writer's opinion that the farmers should, more than ever, intensify their efforts in diversification and use their every means to make themselves absolutely self-dependent, in order that we may not have another collapse in land and commodity prices, such as occurred in the twenties. Farmers should, also, make every available use of rural electricity, reforestation and every other facility which tends to make their business more stable and themselves more secure against the varying trends of business.



# Dave Holmes -- Master Farmer

By B. W. ANDERSON, '41

**M**R. Dave Holmes was selected as one of the six master farmers of South Carolina because he has practiced diversified farming ever since he began his career as a farmer. Even when cotton was forty cents a pound Mr. Holmes did not utilize his entire crop land for the sole purpose of raising cotton as many other farmers of the South did. As a result he is now reaping the benefits.

Mr. Holmes lives in Edgefield county near the town of Johnston, S. C., and most of his farm land is located in the "ridge"—a section of the state just above the fall line.

Mr. Holmes began his career as a tenant farmer and soon afterwards purchased a few acres of land himself. Now he owns 1,700 acres of Edgefield county farm land all of which he bought himself except 125 acres which he inherited from his father 12 years ago. He bought a large percentage of the land during the depression because he saw that by successful farming he could pay for it at an advantage.

His acreage is clear of debt and he has 800 acres in high cultivation, 150 acres in cleared

bottom land pastures, and 150 acres more being cleared. By hard work, and proper farm management combined with excellent business ability Mr. Holmes has risen from a tenant farmer to the owner of one of South Carolina's best farms.

Mr. Holmes does not have the worry of looking for new tenants each year because he has work for them to do all the year round. After the crops have been harvested there are peach trees to be pruned, manure to be hauled from the barn, work to be done in the wooded areas, and repairs to be made around the house. And in return for much of this work the tenants are paid extra. "You won't lose anything, and incidentally you won't lose your hands if you give them something to do the year round to feed themselves," Mr. Holmes said.

Mr. Holmes' cash enterprises include cotton, peaches, asparagus, and beef cattle. His "Live at home" products include hogs, chickens, beef cattle, sweet potatoes, vegetables of all sorts and dairy products.

"A dozen years ago," says Mr. Holmes, "I saw the need to get away from all cotton depen-



A View of the Farm Planned for Erosion Control





Aerial View Showing the Holmes' House and Sections of the Orchard

dence and I wanted to try peaches. At first I was not encouraged by my neighbors who thought I was ruining my cotton land. Soon Clemson College and the United States Department of Agriculture helped me to get started with my first orchard which is now eight years old."

He now has 150 acres of trees of various ages which yield an excellent production. Last year thirty acres of Elbertas produced forty-eight carloads of United States number one's, two or more inches in diameter. He has built from lumber off his own farm a large, well equipped peach packing shed which provides for proper packing of the crop. Mr. Holmes sells his peaches through the South Carolina Peach Growers Association under the "Palmetto Queen" brand. Mr. Holmes employs from fifteen to twenty hands each day during the year in his orchard and general farm work. "As a winter cover crop for orchards I use rye altogether," says Mr. Holmes.

In his orchard management Mr. Holmes is in constant touch with extension horticulturists getting up-to-date information and suggestions as to proper pruning, spraying, cover crops, fertilizers, and marketing. He has devised a special wire support for trees heavily laden with fruit. This device consists of forty or fifty feet of number ten wire caught in forks of limbs and en-

circling each tree. Although the wire is expensive it more than pays for itself in saving trees and fruit, and is more convenient than wooden props.

It is also easy to see that Mr. Holmes is skillful in the production of cotton by the fact that on 158 acres now grown he makes around 175 bales per year. This is done through his insistence on purebred seed treated against disease, legumes and proper crop rotation—no cotton following cotton; proper fertilization with intelligent attention to plant food needs.

Asparagus is one of Mr. Holmes chief cash crops because his farm is located on "The Ridge" area, long famous as the center of South Carolina asparagus crops. On 70 acres of "grass" he produces 60 to 100 crates per acre annually. Special care is taken to put out a quality product. That is the reason he makes money out of this highly specialized truck crop. The Holmes asparagus crop is marketed through the Ridge Peach and Vegetable Association, a Co-operative marketing group.

Proper crop rotation is brought about by planting corn and other small grains which provide feed for livestock and also food for the "live at home farmer." Usually 200 acres of corn are planted, yielding thirty to fifty bushels per acre. For livestock feed there is oats, the yield varying from 40 to 50 bushels per acre.

*Continued on page twenty-four*



# Agriculture's Related Industries

## AGRICULTURE AND ELECTRICAL ENGINEERING

By S. C. HUNT, '40

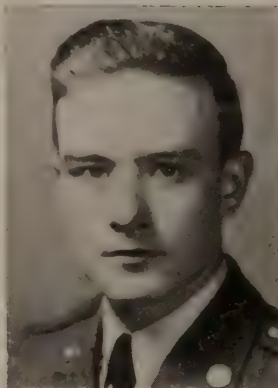
The Rural Electrification Administration is sponsored by the federal government and differs from other government agencies in that it is a cooperative.

The R. E. A. project, as it is called, is conceived and planned by those farmers interested in its benefits, and the government furnishes technical and legal advice. The government supervises the project only as a protective interest in its investment.

These electrification projects are made possible by new developments in the electrical field. The improvements have taken place in the physical construction of the lines such as wider spaced poles, wires of higher tensile strength, smaller yet efficient transformers, the abolition of cross arms, and a revolutionary system of transmission wiring. The electrical power for these lines can either be supplied from private concerns or by the establishment of the cooperative's own generating plant. The federal government has been instrumental in securing these private contracts and by lending money for the station. Then generating stations at Santee-Cooper and Buzzard Roost will furnish cheap power to some of the lines in South Carolina.

The availability of cheap electrical energy has greatly reduced the manual labor required on the farm. Design engineers have made possible new equipment such as well pumps, irons, washing equipment, milking equipment, refrigeration equipment suitable for the electrified farm. Lighting and heating power is available. Communities have banded together, buying electrical refrigerating equipment and establishing community refrigeration centers. These have proved very economical in preserving the farmers produce and meats. The whole system is founded to benefit those farmers who live in a locality where private lines could not be economically installed.

The country farmer, with the aid of the government and the electrical engineer, now has city conveniences through the use of the Rural Electrical Cooperative.



S. C. HUNT

## AGRICULTURE AND CIVIL ENGINEERING

By G. C. COMMANDER, '40

At first glance one would be inclined to think there is no relationship between agriculture and civil engineering. However, after a little thought one can readily see that the two subjects are closely connected in several ways. The more important of these are: transportation of farm products, irrigation, and soil conservation.

In the early eighteen hundreds civil engineers were responsible for the construction of navigable waterways, the principal means of transporting farm products at that time. Soon however, water transportation was outmoded by the advent of the railroads putting the transportation of these products on a larger scale. It was not long before the movement of the population to cities increased the demand for low cost farm produce. The railroads could not solve this problem. The solution, however, came with the building of super highways and truck routes, making it now possible to take care of the tremendous demand for the farm produce, and making truck-farming one of the major industries of the country.

The Federal government allotted several millions of dollars for Boulder Dam, an irrigation project covering the area around the Colorado River—without the aid of the civil engineer this project could never have come into being. It is impossible to conceive the benefits that have already been derived from this engineering feat. The farmer who formally had tried to cultivate the desert land failed because of poor soil and lack of rain. Now farmers in that area enjoy fertile soil as well as rural electrification. This has been a great advance in the reclamation of waste lands by irrigation, and betterment of community life.

The closer the connection between the farmer and the civil engineer, the greater is the net return to each. Thus if the south is to remain one of the greatest agricultural regions in the world, agriculture with civil engineering and related subjects must go hand in hand.





# The Man, The Land and The Future

By R. L. ARIAIL, JR., '40

In the South, and especially this section, soil erosion is a phenomena that almost every person is aware of, yet it is dealt with quite casually. We read and hear about it often, but very few of us realize the terrible significance of the facts that lie behind these two words. We trip lightly over the term and pass it on as a problem that something ought to be done about, yet boast of the richest and most powerful nation in the world little dreaming that with the close of every day some 8,500,000 tons, on the average, of our precious nation has slipped away forever. Each year not less than 3,000,000,000 tons of soil is lost from the croplands of America by water and wind erosion.

As a matter of fact, the erosion problem is of vital importance to every person in this country whether engaged in agriculture or not. It affects, for instance, lawyers, aviators and manufacturers as well as the farmer. This problem is not to be dealt with casually, as the very future of our country, or of any country, depends upon the conservation of its soil.

That may seem a very bold statement, but, never the less, it is true. What is more, the relationship between soil production and the prosperity of the people is so closely connected that the history of mankind, to a considerable extent, can be interpreted in terms of the soil and what has happened to its as the result of human use. The hand of man, rather than the ravages of nature, probably caused once rich and populous regions to be reduced to poverty and even complete abandonment.

The shifting sands of the Sahara and Gobi deserts now cover the remains of once large and populous cities. Parts of Palestine and Mesopotamia were once very rich and supported great populations, but, as a result of neglect and abuse of the land, they are now quite barren. Civilizations are rooted in the soil. Destroy the soil and you destroy the civilization.

If this has been the case so often in the past, why, then, do the American people pay so little attention to the destructive process going on in this country today? The reason is simple though the cure may not be. This nation has developed very rapidly and our resources were so vast and the chances to "get rich quick" so great that mistakes did not seem to count, and we did



San Simon Wash

"... The meadows were covered with soft, lush grass, almost untouched by animals"—Will C. Barnes, 1882.

\*Courtesy U.S.D.A. Soil Conservation Service.

not take time to think about such seemingly trivial things as soil conservation. The American civilization is still a young one, relatively speaking, and the American people have a lot to learn. We can benefit much from the mistakes of the older civilizations. Another fifty years may be too late.

Henry A. Wallace, Secretary of Agriculture, has said: "The earth is the mother of us all—plants, animals and men. The phosphorus and calcium of the earth build our skeletons and nervous systems. Everything else our bodies need except air and sun come from the earth. Nature treats the earth kindly. Man treats her harshly. He overplows the cropland, overgrazes the pastureland, and overcuts the timberland. He destroys millions of acres completely. He pours fertility year after year into the cities, which in turn pour what they do not use down the sewers into the rivers and the ocean—This terribly destructive process is excusable in a young civilization. It is not excusable in the United States in the year 1939."

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## The Purina Experimental Farm      The Government and the Land

By L. R. ARRINGTON, '40

**E**ACH year the Danforth Fellowship is awarded to an Agricultural junior in nearly every Agricultural College in the United States. This Fellowship is awarded jointly by the Ralston-Purina Company of St. Louis, and William H. Danforth. It includes a month's study, two weeks of which are spent in St. Louis and at the Purina Experimental Farm, and two more weeks in leadership training in the American Youth Foundation at Camp Miniwance near Shelby, Michigan.



L. R. ARRINGTON,  
Winner of the  
Danforth Fellowship

The days spent on the Purina Experimental Farm are, probably, more interesting and educational to agricultural students than any other phase of the Fellowship work. This 360 acre farm is located forty miles west of St. Louis at Gray Summit, Missouri, and is one of the largest and most completely equipped research farms in the country. The Purina Company operates it exclusively as a testing ground for the numbers of livestock and poultry feeds which it manufactures. Specialists in the field of poultry, animal husbandry, and nutrition are in charge of the work, and in all there are approximately 100 employees on the farm.

There are large numbers of practically every kind of farm animal and fowl on test there the year round. In round numbers, the number of animals is: 10,000 chickens, 2,000 ducks, 2,000 turkeys, 100 dogs, 600 hogs, 225 beef cattle, 100 dairy cattle, 125 silver foxes, 500 mink, and great numbers of pigeons, rabbits, and coons. Tests with the foxes and mink are run to try to find a dry substitute feed which will take the place of fresh meat and at the same time not affect the quality of the pelt of the animal. Experiments with the other animals and poultry are made to determine the best feeds for production, and at the same time make it an economical feed.

It is interesting to see just how a new type feed is made into a standard brand for sale on the market. First, the nutrient requirements of the animal are carefully determined in the chemical and biological laboratories. When these have been found, several trial mixes, each fulfilling

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By C. M. AULL, '39

**F**OR many years there has existed the question of the right of the State to interfere with private business. Whether this right should exist or not, is not important. The fact that it does exist is irrefutable and makes argument useless. It is now a question of how far the State will carry the rights which it has.

Land is peculiarly affected by this question of property rights, in that land is very different from other types of property. The fact that land is indestructible may be an excuse for increased governmental control over it, since the land will exist for society after its present owner has ceased to enjoy life. If however, that individual had so depleted the land as to make it worthless it would be a liability instead of an asset to society, and could easily create a great social problem. Another important characteristic of land is its immobility. Land cannot be so placed as to enjoy an economic advantage of location as some business might be. In general land values are increased by the building of roads, or towns or some other form of public activity, which is carried to the land. Profit to the owner, or unearned increment, as it is known to the economist, is created by this rise in values. The fact that this profit was created by a public venture, offers a sound reason for the public to attach some of this profit by tax. This may be regarded as further interference with private business whether warranted or not.

The space and extent of land is another characteristic peculiar only to it. The fact that there exists only a limited amount of land, that land cannot be created, makes it more valuable. With increased population more demands will be made on the limited supply, and it would seem advisable that some agency provide for the conservation and improvement of our soil resources. If this is not done by private industry, then it would seem to be the task of government. However, it could not be done without lessening private property rights.

Land has always varied greatly in quality, but the ravages of time and use have increased these gradations in quality immensely. Lands of the world range from the fertile valleys of the Nile river to the worthless wastes of the Sahara desert. It is this great difference in quality that often marks a wealthy nation from a poor one.

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# Better Seed to Plant

By R. C. WANNAMAKER, '40

THE farmers of the United States today have available to them the most complete and the most useful body of information based on research findings than the agriculturists of any country have ever had. The wise planter is taking advantage of newly discovered better methods and new inventions which have been proven by research men to be money-saving. The development of various seed treatments is one of the most valuable of their entire works.

Some studies of the effect of cottonseed treatments on seedling emergence and survival under field conditions in South Carolina were carried on in the early 1930's. Then, in 1936 in an attempt to discover a method of control of the seedling disease known as "damping-off", and, also, to determine methods for getting a better per cent emergence, experimental fields were planted in various sections of this state. For a study of the effects of seed treatments, one-acre plantings were made at Smoaks, Kathwood, Florence, Pontiac, Chester, Woodruff, and Clemson—thus every section of cotton-growing South Carolina was represented. The results of this experiment proved that treatment with ethyl mercury chloride (Ceresan) increased the yield of seed cotton per acre very appreciably (it has been shown that in years favorable to disease and when diseased seed are prevalent this increase may be as high as 40-45 per cent, but in years when conditions do not favor the causal organism and seed are generally, healthy, the increase may be nil or so slight as to be unappreciable). In the experiment of this particular year natural seed treated with 2 per cent Ceresan showed an increase in yield of as high as 33 per cent in some cases over untreated check plots, delinted seed plus 5 per cent Ceresan showed a greater increase in most cases, and delinted seed which had not been treated (except with the sulfuric acid used in delinting them) showed a remarkable increase in yield—this seems to indicate that our most important and most costly cotton diseases are probably seed-borne. The anthracnose fungus was found to be chiefly responsible for "damping-off." It is borne on the seed mainly, but it is also residual in the soil, and crop rotation helps in controlling this phase of the causal organism. Also, if seed are stored for 2 years or more the fungus seems

to die out or lose its vitality to a certain extent. Two year old seed are not helped nearly so much by treatment as new seed are, because they are more disease-free to start with. However, research men and others who have been specializing on this one thing advise farmers to treat (and delint if possible) all seed which they have for planting.

## Cotton Seed Treatment Brings Large Profits

The South Carolina Extension Service says: "Seed treatment pays—farmers of South Carolina are more than a million and a half dollars better off by having treated seed during 1937 . . . the increase during 1937 was worth \$6.24 per acre, during 1936, \$9.08 per acre, above cost of treatment, based on results of demonstrations.

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Authorities advise dust-treating seed with New Improved CERESAN to increase yield values by reducing seedling blight, smuts of oats, covered and black loose smut and stripe of barley, stinking smut of wheat. In tests, the average yield increase has been 6% on barley and wheat; 18% on oats! About **twice as economical** as other dust treatments; costs as little as 1 3/5c per bushel of seed. Treat **now** in spare time. Pamphlet free from dealer. Bayer-Semesan Company, Inc., Wilmington, Delaware.







## BETWEEN THE

### M. G. Mann Here

Recently, Mr. M. G. Mann, General Manager of the North Carolina Cotton Growers Cooperative Association at Raleigh and, also, of the Farmers' Cooperative Exchange, visited Clemson where he conferred with Dean H. P. Cooper and various departmental heads relative to the participation of Clemson College in the determination of the most economical feeds in South Carolina. While here, he also spoke to the marketing classes on cooperative marketing of cotton.

Mr. Mann instigated the forming of a rapidly growing cooperative purchasing agency several years ago, which handles open-formula chicken and stock foods which are prepared by State Agricultural school formulae. The organization plans to extend its activities into South Carolina. The North Carolina association has withdrawn from the National Association, and under the leadership of Mann, offers an optional contract whereby the growers may offer their cotton to the cooperative, which cleans it and makes a cash offer, but allows the grower to shop around for other bids and to accept the best offer he receives. The North Carolina Cooperative Association is reported to have greatly expanded its purchases through these optional contracts and is said to be rendering a real service to North Carolina farmers.

Mr. Mann's organization is expanding the cooperative movement by means of essay contests among rural schools, and he also conducts a training school for high school and college graduates who wish to promote cooperative organization.

THE AGRARIAN

### Dairy Club Shows Interest in Old Grads

The Dairy Club meets every two weeks. Programs alternating students and outside speakers are conducted. At present the club is sponsoring a survey in attempting to contact all Dairy graduates of Clemson, finding their present and past positions, and addresses.

### F. F. A. to Present Play

The officials of the F. F. A. recently attended the State Fair in Columbia, S. C., to help with the teaching there. Among the club activities scheduled for this year are plans to sponsor a judging contest to be held here next spring, and also plans to present a play, "The Farmer Meets the Tariff."

Fifteen Seniors of the Vocational Agricultural Education class will present the play at the State Teacher's Meeting in Greenville in the Spring and again here for the Agricultural students' benefit. If, as is expected, the play is sufficiently successful, it will be given in high schools throughout the State.

One purpose of the club is to train Vocational Agriculture teachers in their duties as local advisors of the F. F. A. in high schools. Membership is open to all Agricultural upper-classmen. Officers are selected twice a year, and, in addition to other activities this year, members are studying parliamentary procedure and F. F. A. ceremony and work.

THE AGRARIAN

### Research Director Speaks

Mr. Harry G. Davis, Director of Research for the Farm Equipment Institute of Chicago, was a recent visitor of the Agricultural Engineering Department of Clemson. Mr. Davis was making a tour of the colleges in the South and mid-West which offered an Agricultural Engineering course. While here he made an informal talk to the Junior Agricultural Engineers on the rise and improvements of farm machinery during the last decade.

THE AGRARIAN

### A. S. A. E. Taps New Members

The A. S. A. E. recently initiated a number of new members. Among the club activities scheduled for this year is the work for the trophy which is presented annually by the Farm Equipment Institute to the most active chapter of the A. S. A. E. Also, the club will sponsor the annual Farm Machinery Day next spring.



## FURROWS

### Judging Team Made Trip to Chicago

Clemson's Animal Husbandry Club is rapidly getting into its schedule of activities. The club at Clemson was started in 1932 and is associated with the National Block and Bridle organization which is in all leading Agricultural schools. Membership is open to all boys who are especially interested in Animal Husbandry.

This year the club plans to have thirty-five members and some decided changes are in line. Three main social activities are scheduled, and among the aims of the organization is the "encouragement of the members in public speaking."

Possibly the most important activity of the club is the sponsorship of a judging team. This team is open to all interested and is coached by Mr. Hauser of the Animal Husbandry Department, who ranks high in National competition. Already they have participated in contests at the State Fair and at the Spartanburg County Fair and a number of other trips are planned. Recently they visited Governor Morrison's farm in Charlotte, N. C., where some of the finest beef cattle in the South are found. The team also entered the contest at the International Livestock Exposition in Chicago, December 2-9, and while in Chicago were entertained by the Exposition officials.

THE AGRARIAN

### Ag. Ed. Seniors Attend Social

On the weekend of October 28, the Winthrop Home Economics girls and the Agricultural Education Seniors of Clemson, met together at the 4-H camp at Rocky Bottom. A joint program discussing the cooperation and relationship between home economics teachers and agricultural teachers in rural schools was held. Afterwards there was a campfire, stunts, and dancing. The State supervisors of Agricultural Education and Home Economics, and the entire Education faculties of Winthrop and Clemson were present. The camp was conducted by student committees.

### New Professor at Clemson

Mr. W. N. McAdams has recently joined the staff of the Agricultural Engineering Department. Mr. McAdams finished at Clemson in 1938 and took graduate work at the University of Georgia, where he has been teaching since then.

Mr. McAdams succeeds Mr. J. B. Richardson, an alumnus of Mississippi State, who is now with the Extension Service at North Carolina State.

THE AGRARIAN

### Alpha Zeta Active

Clemson's chapter of Alpha Zeta, National Honorary Agriculture Fraternity, recently sponsored a social for the freshmen enrolled in Agricultural subjects. This was designed to help the freshmen become better acquainted with the Agriculture faculty.

New members recently inducted into the fraternity, were chosen for scholastic standing. Among the club activities for this year is the publishing of a news letter which is to be sent to Clemson alumni members of Alpha Zeta.

THE AGRARIAN

### Kappa Alpha Sigma Pushes AHEAD

Kappa Alpha Sigma is the Clemson College Student Chapter of the American Society of Agronomy. It was organized in 1929 and its aim is to bring agronomy students and professors closer together so that current agricultural problems may be informally discussed from time to time.

At a recent meeting of the fraternity, Dr. G. H. Collings, Professor of Soils, and advisor for the organization, made a suggestion that the local chapter send a Christmas news letter to every person that has ever graduated in agronomy from Clemson College. This suggestion was unanimously approved by the members of Kappa Alpha Sigma, and a committee was immediately appointed to write the letter which will be mimeographed and distributed a few days before Christmas.



# What of The War in Europe and Our National Economy?

By E. W. COOLER, '41

Cash on the "barrel head" and carry your own goods is America's invitation to belligerent European nations. Through the nullified Embargo Act America's vast store of war munitions becomes potential agents of destruction somewhere in Europe. Reasons for the reversal of popular opinion as evidenced in the recent action of Congress are multiple, but few regarded the avowed purpose, to stimulate American industry in the fashion of the first world war, as imperialistic as the Soviet Union promptly branded our action. In Europe's misery and despair America envisioned recovery and lasting prosperity.

Enthusiasm is already tempered by the deliberate manner in which the belligerents have placed their orders, and Americans are now thinking rationally for the first time since speculative activity in early September forced war goods to a new high in the exchanges of this nation. Economic fallacies embodied in our present "war boom" legislation will become more obvious with time. They are already plain to even the amateur economist, who reasons—who takes time to think.

Warring Europe is in no position to pay. The cash terms imposed by the modified Embargo Act suggests the necessity of greater exportation of European products, or the sale of bonds and securities or greater taxation of the populace, or, as we are led to believe, a flow of European gold to the American Market. None of these alternatives are economically sound.

Europe in normal times experiences great difficulty in trading with America on a long-time barter basis, for our superior resources require few of the commodities which continental Europe can supply, and we furthermore, are sold on the self-sustaining theory. During a state of war, with internal industries transformed to feed a war machine, and colonial, or any international trade, crippled by marine warfare, Europe can scarcely trade on a reciprocal basis.

America, in dealing in stock and security of belligerent nations is definitely outlawed by the recent legislation, and, consequently, the most

practical means of financing a war is not a possibility. Few nations of Europe have American credit unmarred by the first war, and the Johnson Act of 1934 closes the American market to securities of these nations.

Taxation has reached the breaking point in every belligerent nation. The proverbial "last straw" would be added by further taxation to overcome the cash disadvantage in the American Market. Taxation has reached a new high in England where thirty-five cents of every dollar goes for direct taxes. Then, too, war is not a popular cause in any nation today. There is no shouting and playing of drums in this war. Instead there is only gravity, and the men march to battle solemnly, knowing that all is not a great and grand experience in war. Further taxation will serve to lower the morale.

England and France reputedly have close to 4 1-2 billion dollars of liquid, or easily liquidated, assets in America. It was supposed at the onset that this would become allied buying power. But they are reluctant to see further increase in America's rapidly growing stock, nor would that be desirable even so far as America is concerned. The United States already has 50 per cent plus of the world's gold reserve, which is over-valued for any other purpose than money. And to acquire more may mean that other nations may relinquish the gold standard, and leave America holding the bag.

What is the weakness in the argument that embargo repeal heralds a return of prosperity? Simply that war time demand is not a normal demand anymore than war time industries are normal industries. Until the latter part of this month the chief orders from European belligerents were as follows: \$8,000,000 worth of ordnance shells and torpedoes from an East Coast manufacturer; about \$750,000 worth of sub-machine guns from Thompson Automatic Arms Corp.; 6,000 horses from the Midwest commission firms; 200,000 2 1-2 pound army blankets from two eastern textile manufacturers; 6,000 trucks from Studebaker, White Motor and

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# About This and That . . .

BY THE EDITORS



## MORE PRAISE FOR THE FARMER

A DOCTOR yearns to discover a new cure for some fatal disease, a school teacher fancies himself a college president, a lawyer desires a judgeship. These are pinnacles to be attained. What then does a farmer, a man who works harder than most of these men for less monetary return, hanker for? Some say a better living, but as a rule farmers live well. They have comfortable, spacious homes, adequate clothes, and they probably eat better than the average person engaged in some other occupation. What the farmer does not have, and which the doctor, lawyer, and college president do have when they attain their goals, is praise, and the farmer, like any other human, likes to have his labors recognized. That is why many farmers set their ambition to win the title "Master Farmer." By that title they are set apart as one who has not only made a living from the soil, but has done this job in an efficient, business like manner that leaves no doubt that they have not gone about their work in a shoddy, hit and miss way, and that they have planned their every move, taking full advantage of new developments and new methods in their field. These are the men who have had the courage to break away from obsolete, inefficient methods of seeding, tilling, and harvesting handed down by their forefathers. These are the men who have had the foresight to plant new crops, using more and efficient methods of cultivation. These are the men who have had the stickability to carry on their work through discouragements and obstacles that would have beaten down many a less hardy soul, and to emerge as a recognized leader in their work.

Its much hard work and little praise that the farmer gets, so let's give a hand to those few who have achieved a rarity in their field.

THE AGRARIAN

The ant heap is the food bank of the ant, but the silo is the reserve bank of the stock farmer. It is not even necessary for a farmer to have money in the bank, since fat and healthy stock on the farm throughout the year represent ready cash.

## WHAT'S IN A NAME?

In the interest of our readers we will attempt to clear up a question that has been asked us time and again: What does AGRARIAN mean? Referring to the dictionary we find that Mr. Webster says . . . "of or pertaining to fields or lands, or their culture." The word suggests, then, that anything related to the land and its culture can be spoken of as agrarian, as for instance, agrarian life, agrarian problems, and agrarian country.

The South has been truly spoken of as an agrarian country, for here are located about half of the farms and farm population of the whole nation. Any problem that arises in the South is bound to be either directly agricultural in nature or closely anchored thereto. When the South prospers, the farmers are prospering too.

South Carolina is one of the most agrarian of all the agricultural states, and Clemson College is an institution that was founded for the promotion of agrarianism; hence, the very appropriate name of this magazine.

THE AGRARIAN

## AG FAIR FOR CLEMSON

In the October issue of **The N. C. State Agriculturist** we noticed that the Ag students of North Carolina State College put on an agricultural fair lasting from the 10th through the 14th of that month. Its purpose was to offer solutions to the farm problems of the many visitors who attended from all over the state.

Many exhibits were presented and judging contests of livestock, crops, poultry and dairy products were held. The Alpha Zeta sponsored an information booth. In short, the fair was a great success, and gave the students a chance to show their ability. As they express it, "this is one thing on which we do our own creative thinking—no stuff from the 'prof'."

**The Agrarian** is wondering if something like this could be started at Clemson. The engineers already have their "engineering day". Why can't the "aggies" have an "ag day"? Maybe the members of the Alpha Zeta and Alpha Tau Alpha could get together and hatch up something.



# CALF WINDOWS

By H. A. JOHNSON, '40

THE physical structure of the stomach of the cow is entirely different from that of any other farm animal except the goat and the sheep. The cow has a stomach of four compartments which are called the rumen or paunch, reticulum or honey-comb, omasum or manypiles, and abomasum or true stomach, in order of passage of coarse feeds. The rumen of a mature cow is a large organ capable of holding as much as fifty gallons. The rumen was probably in-

tended by Nature to initiate the digestion of the roughages or other coarse foods consumed by the cow. In addition it serves as a place of storage for the consumed feed before rumination takes place. After regurgitation and mastication, the food passes into the reticulum, which is another cavity and is smaller, holding not more than 12 or 13 quarts. From this compartment the food enters the

omasum where the water is mashed out of the material by the peristaltic action of the organ. Some of the water is absorbed by the walls of the omasum, but most of it passes into the abomasum. The food passes directly from the omasum into the abomasum or true stomach. This compartment has a breaking-point capacity of twelve quarts. It is here that the real digestion of food takes place. From here on the digestive processes of the cow are similar to those of non-ruminants.

In the raising of dairy calves many difficulties are encountered. The most common is a disturbance of the digestive tract. In order to discover some of the causal factors, an experiment designed to determine the route followed by milk when consumed by calves has been conducted at Clemson College by Drs. G. H. Wise and G. W. Anderson of the Dairy Department.

An unusual experimental technique was used in this investigation. Previously, most of the experimenters had slaughtered the animals after they ingested milk and subsequently carefully opened the stomachs to locate the milk. This was not the method used in performing this experiment. To observe the path traveled by milk when it was consumed by a calf, an opening, commonly known as a "window", was cut in the left side of the experimental animals. The wall

of the rumen was sewed to the skin and, after healing, did not in any way retard the growth of the calves. Through this opening the rumen and reticulum could be observed while the calf was consuming the milk either from an open pail, or from a nipple pail.

Nearly every cattleman knows that calves which nurse from the cow are usually free from many of the ailments commonly

observed in calves fed from an open pail. This fact led the experimenters to believe that the passage of the milk into the wrong section of the animal's stomach was one factor causing much of the trouble. Though Nature provided the bovine stomach with compartments, it seems that she intended for the first three "rooms" to remain rudimentary until the young animal begins the consumption of coarse feeds. The normal path, then, for milk to take when ingested by a calf is directly into the abomasum, or true stomach. When a calf drinks from an open pail, it takes such large gulps that the milk frequently passes into the rumen where it is likely to remain for some time, undergoing abnormal decomposition, thus disturbing the digestive processes.

Since it was desirable to duplicate Nature's method of feeding calves, a nipple pail was used. This consists of a rubber nipple fixed in, and pro-



One of the Clemson Calves with "Window" for Observation.



truding from, the bottom of an ordinary pail. The pail was then either hung on the wall or held at the normal height of a cow's udder. By this method it was found that the milk rarely entered the rumen (an average of 2.2% of the observations) and never in large amounts; whereas when the milk was consumed from an open pail, the frequency of entrance averaged 36.9%, ranging from 0 to 78%. The amount of milk entering in each case was far greater than the amount entering when nipple fed.

It might be interesting to note that when water is fed by the above mentioned methods it escaped into the ruminal and reticular cavities more frequently and in greater quantities than did milk. It is perhaps, just as abnormal for a calf to drink milk from a pail as it is to suck water from a nipple.

It has been found by previous investigators that milk is only digested in the abomasum; therefore, the detrimental effects of milk entering the rumen and other cavities is two-fold; namely, nutritional and physiological. When milk enters the rumen, the nutrients are not readily assimilated by the body. This fact is important because in the growing calf the nutrients are needed and must be provided almost constantly to insure optimum growth and to maintain a thrifty condition.

Furthermore, the passage of the milk into the rumen is responsible for the digestive disturbances resulting from the abnormal decomposition of the milk while it remained in the ruminal cavity. This disturbance is commonly manifested in the form of diarrhea.

Apparently, the older the calves become the greater is the frequency of entrance and the larger the volume of milk which passes into the rumen; yet physiological disturbances are very rare in older calves if they are receiving a normal ration of grain and roughages. When a calf is restricted to a whole milk ration over a prolonged period of time, the curd, which frequently accumulates in the rumen, will become putrified and together with other decomposition, cause marked disturbances in the physiological functions of the body. From these facts it can easily be seen that the nature of the ration fed with the milk plays an important part in determining the magnitude of the harmful effects of the milk passing into the rumen.

This is a discussion and condensation of an article printed in the September issue of the Journal of Dairy Science, and is printed here with the consent of the authors.

## More Electrical Equipment for the Farmer



★ As electric service has been extended to more and more customers a constantly increasing number of appliances and implements have been developed for the use of this service to the convenience, the comfort, the health and the profit of those who have such service available.

★ One of the most interesting phases of the power industry recently has been the development of equipment for the particular use of the increasing thousands of farmer customers to whom electric service is being made available.

★ Dairymen are turning by the wholesale not only to automatic water systems and refrigeration equipment, but to automatic electric sterilizers and water heaters. Commercial poultrymen have long been using electric lights, but now increasingly they are using electric brooders, electric water warmers in winter, and other electric equipment.

★ Dairymen, poultrymen and other livestock operators can now secure feed grinding equipment that will do an entirely satisfactory job for from \$111.70 to \$260, depending upon size of mill and of motor. These mills grind from a few hundred to 1800 pounds of grain per hour, depending upon the fineness or coarseness of the screen. And they grind ear corn and roughage as well as the cereal grains and shelled corn.

★ Electrically operated corn shellers are also on the market now, with which a small electric motor will do the work in an hour that would require hours to do with hand operated shellers.

★ Electric service promises to do for the agricultural community about the same sort of miraculous job that it has already done for the industrial community.

**DUKE POWER COMPANY**

GENERAL OFFICE  
CHARLOTTE • NORTH CAROLINA



# PROFITS FROM FARM MANURES

By R. L. HEARON, '40

TODAY, when farmers in all the South are casting about for every available means of making the largest economical yield per acre, they should look to one of their items on the expense side of the ledger, namely, their fertilizer bill. There is no getting around the use of compounds which increase the productivity of the soil, especially our southern soils which have been in a state of cultivation since the early settlers came to this country, and the importance of plant and animal residue as a supplement to commercial fertilizers has been ignored by Southern farmers until lately, relatively speaking.

Barneyard manure is an excellent fertilizing material. Hamilton states in his 1932 bulletin, No. 92, Farm Manures, "The horse, mule, cattle, and hog population of South Carolina produces annually solid and liquid manure containing the nitrogen, phosphoric acid, and potash equivalent of 211,400 tons of nitrate of soda, 77,344 tons of 16% acid phosphate and 52,236 tons of muriate of potash. At current prices for these fertilizer compounds, the annual production of manure in South Carolina has an equivalent value of nearly \$12,000,000. It is probable that \$9,000,000 of this amount is lost." Today South Carolina farmers are using more and more of this valuable by-product. Those who are uncertain as to the practicability of its use should be convinced of its value.

Manure helps to produce economical yields in the following ways: (1) It carries a considerable quantity of elements necessary for plant growth, mostly nitrogen and potash, the per cent of each varying with several factors which will be discussed later; (2) It increases the bacterial content of the soil; (3) It adds organic matter to the soil; (4) Hall states that manure also improves the texture of the soils, to sands it gives cohesion and water retaining power, while it renders clay more porous and friable.

As previously stated, the composition of the manure depends upon several factors, which are: the kind of animal, the kind of bedding used, the age of the animal, the foodstuff consumed by the animal, and the methods of storing the manure. In a Maryland Experiment Station Bulletin, Taliaferro and Patterson show that solid excrement from hens and sheep is very high in nitrogen

and potassium, but since very little manure is used from these sources in this state, we will not go into any detail about them. Our main sources of manure are cows, horses, and pigs. This same bulletin shows that a cow may produce about 20,000 pounds of solid excrement per year, which contains about 0.30 per cent nitrogen, and about 0.10 per cent potash. A cow also produces about 8,000 pounds of liquid excrement which contains about 0.80 percent nitrogen and 1.4 per cent potash. A horse produces about 12,000 pounds of solid excrement per year which contains 0.50 per cent nitrogen, 0.25 per cent phosphoric acid, and 0.30 per cent potash. This animal also produces 3,000 pounds of liquid excrement which contains 1.2 per cent nitrogen, a trace of phosphoric acid, and 1.5 per cent of potash. A pig produces around 1,800 pounds of solid excrement and 1,200 pounds of liquid excrement per year. The solid excrement contains 0.60 per cent nitrogen, 0.45 per cent phosphoric acid, and 0.45 per cent potash, while the liquid excrement is composed of 0.30 per cent nitrogen, 0.12 per cent phosphoric acid, and 0.2 per cent potash.

It may be seen that manure is not a well balanced fertilizer, that it is especially low in phosphorus, and since many soils need phosphorous, the value and efficiency of the manure can be increased by the addition of phosphate fertilizers.

Bedding is a very important factor to consider in determining the value of the manure. The compounds in the liquid excrement are uric acid, soluble phosphates, and potash salts. These compounds are either ready for plant use or else they need very little change, whereas the solid excrement must undergo quite a change before it becomes available. Since it is the bedding which absorbs the liquid excrement, we see that it is very important to use a straw that has very high absorbent qualities and that will also add both organic matter and nitrogen to the soil. Wheat and oat straw are both considered excellent for these purposes. The bedding should not be of coarse material, such as cornstalks, for this coarse material will prove troublesome when spread in the field.

Caring for the manure between the time it is collected and the time it is placed in the field

is of great importance due to the tendency of the manure to ferment and leach. Thorne, in his book, *Farm Manures*, states that after 5 months exposure in an open yard, the total weight of the manure was reduced by 57 per cent, the nitrogen was reduced by 60 per cent, the phosphorus by 47 per cent, and the potassium by 76 per cent. This indicates that the manure should be hauled to the field as soon as it is collected to prevent these losses, but if this is impossible, the manure should be stored carefully, preferably in a tight bottom shed and on a straw bedding. If no shed is available, the next best method is to store it in a covered concrete pit. While in such a pit, the manure should be kept packed to prevent fermentation, and sufficient moisture should be supplied to prevent excessive heating. If neither a shed nor a concrete pit can be secured, and the manure must be exposed to the weather, an excavation should be made where the manure is to be piled, with the drainage toward instead of away from the pile. The sides of the pile should be steeply sloped so as to shed water rapidly, and in dry weather the pile should be moistened so as to prevent burning.

The manure should be applied at such a time when it will not interfere with other farm work. If the fields are too wet for application in the winter, the manure may be applied to grass crops once in rotation, or it may be used as a top dressing for small grains. The farmer should be careful not to apply manure to grain which is planted on land having a high nitrogen content as it will cause lodging, or falling of the grain. Fresh manure is not advocated for potatoes as it increases scabbiness if the disease already exists in the soil or in the potato plants.

The amount of manure applied per acre varies with the type of crop to which it is applied. On truck crops heavy applications may prove profitable, but in general farming, light applications usually give higher returns per ton of manure than heavy applications. In the book, "The Operation, Care, and Repair of Farm Machinery," published by John Deere, it is stated that 20 tons of manure applied on one acre, the manure being valued at 34 cents per ton, gave a \$2.50 crop return per ton, whereas 20 tons applied on 2 acres, the manure being valued at 42 cents per ton, gave a \$3.60 crop return per ton, which is a 40 per cent greater return per ton from the lighter application. In an experiment carried on at Clemson College on 45 plots over a period of 13 years, the 45 plots received different fertilizer treatment. One of these plots,

which received 8 tons of stable manure and 300 pounds of acid phosphate, gave better results than any other treatment used. In fact, the manure-acid plot's average yield per acre was 304.2 pounds of seed cotton greater than the next highest 13 year average yield, which was obtained from a treatment of 600 pounds of 3-8-3 fertilizer.

One of the major reasons for the wastage of manure is the great amount of hand labor required to get it spread evenly in the field. The introduction of the manure spreader has remedied this problem. The mechanical spreader not only spreads small amounts of manure evenly over large areas, but the beaters in the spreaders shred the manure and straw, thereby reducing the possibility of large clods being left in the field.

If you are convinced of the importance of this money saver which may be wasting on your farm, begin taking advantage of it and saving it now. The more that you use the more will be your savings.

"FROM A SNACK TO A BANQUET"

## THE CLEMSON GRILL

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## POET'S LOVE

By T. E. GOODSON, '40

I struggle oh so hard to put my thoughts to rime,  
To say in beauty and poetic grace of time  
What lies embedded here within my fleshy core,  
Within the heart, and sleepin 'fore my soul's own  
hallowed door.

A psalm I sing for pow'r to change these moods  
of mine  
To words arranged and writ by fingers made  
devine;  
For they must catch and freeze love's own sweet  
tinted sigh,  
To armor it against pernicious time and draw  
your eye.

This love, it makes life's very essence quake  
With tender joy; and strange new moods each  
freshly wake  
To thrill the changing hour, to make me ever  
wonder  
At myself, and force the dreadful thought of  
such pure love asunder.

What subtle god controls and charms the heart  
and brain  
To make all kneel, the proud, the humble, rich  
and vain?  
In reverence now one bows before his choice,  
Confessing all and finding peaceful rest from  
love's new voice.

## DAVE HOLMES — MASTER FARMER

*Continued from page eleven*

Rye, a crop which Mr. Holmes finds very profitable, yields 20 to 25 bushels per acre. During 1938 10 acres of rye produced 300 bushels and Mr. Holmes usually plants 30 acres of wheat which yields from 20 to 25 bushels per acre and is made into home grown flour for landlord and tenants. The 4,000 to 5,000 bushels of cotton seed from the yearly cotton crop is traded for cotton seed meal, another important source of livestock feed.

Ever since he has been farming Mr. Holmes has been an advocator of purebred stock. He has three brood sows, two of which are registered, a registered boar, and two brood mares. On the 300 acres of bottom pasture lands he grazes from 75 to 150 Herefords, of which 15 heifers and one bull are registered. In 1938 from a corn crop of 6,000 bushels, he ground 5000 bushels with cob, shucks, and corn which he later fed to the cattle.

Mr. Holmes believes in protecting his soil and building it up with legumes and intelligent use of fertilizer. The entire farm has been terraced during the last two years under an agreement with the Soil Conservation Service, and he says this work alone has been worth more than \$10,000 to him. Most of his cultivated land is planted to legumes every year and as a result of this his land is always in a high state of productivity. Fertilizers are mixed on the farm to meet plant food requirements as experience and Clemson experts have proven profitable.

His farm equipment consists of two tractors used for the purpose of breaking land and to cultivate orchards. He also has various other farm implements which are too numerous to name. This farm equipment is well housed and cared for when not in use.

Mr. Holmes' sharecropping system consists of from 15 to 20 farm families, both white and colored. Tenant houses are substantial and painted, and farm service buildings are good and conveniently placed.

Mr. Holmes has not devoted his entire time to his farm but has taken an active part in many civic activities. He was once a school trustee, church official, foreman of the grand jury, and at the present he is president of the Tri-State Livestock Association, Director of the Edgefield Soil Conservation Association, the South Carolina Peach Growers' Association, and the Tri-State Advertising Association.

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VETERINARIAN

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## *The Revival of the Sweet Potato Industry in South Carolina*

*By P. D. SEABROOK, '41*

THE year 1936 marked the beginning of a new era in the commercial sweet potato production in South Carolina. Outstanding factors responsible for this new development were the introduction of a Louisiana strain of the Porto Rico sweet potato, and a realization on the part of the growers of the necessity of using improved cultural practices, rigid grading and attractive packing.

In the spring of 1936 the Extension service of Clemson College secured six hundred bushels of seedstock of an improved strain of the Porto Rico variety from the Louisiana Agricultural Experiment Station. These seedstock were distributed among 287 growers representing nineteen counties. These growers reported that this strain was far superior to native strains in yield, shape, color and other characters. At the present time practically all of the commercial growers use this outstanding strain.

Many growers did not fully appreciate the necessity of constant selection of seedstock nor the importance of careful handling, strict grading and attractive packing. Previous to this time the general opinion among the farmers was that the growing of sweet potatoes was a comparatively simple matter. No care was taken in the selection of seedstock and, as a consequence, the native strains of sweet potatoes were greatly deteriorated. As has been learned through experimentation, bruising from handling makes potatoes susceptible to storage rots and, consequently, lowers their market value.

Successful farmers today are using great care in selecting seed for future plantings. Seedstock should be selected from high producing hills and those which have desirable shape and color. All bruised, rotten, or black spotted seed should be discarded and the remainder be closely examined for skin and flesh color. Most potatoes in commercial planting are now raised from vine cuttings. This method of planting is recommended as a control measure for disease. In the past the prevalence of diseases has been one of the main detrimental factors in the production of sweet potatoes in South Carolina. Because of the general attitude previously taken toward the growing of sweet potatoes, it has been extremely difficult to establish a good reputation for our sweet potatoes as a commercial product.

The vine cuttings are planted in May or June preferably on a well drained sandy loam soil. The land should be hoed thoroughly and cultivated often enough to keep down weeds and grass. A fertilizer high in potash is recommended, a 3-8-8 or 3-8-10, to be applied at a rate varying from 800 to 1000 pounds per acre. A safe method of fertilizer application is to apply half of the fertilizer at the time the beds are prepared, and the remainder as a side dressing after the plants have set.

Potatoes should be harvested in warm weather. Experience has shown that potatoes harvested in warm weather will keep better in storage than those harvested in cold weather. The proper curing temperature for sweet potatoes is 80-85 degrees Fahrenheit for a period of ten days, and the recommended storage temperature is from 52-58 degrees Fahrenheit. At this temperature range the potato possesses its highest sugar content. At temperatures above 85 degrees Fahrenheit the sugars are used by a high rate of respiration. A high humidity in the storage house is also desirable as it reduces shrinkage to a minimum and helps to thicken the potato skin. A humidity varying from 75-80 degrees is recommended. Before storing, however, the potatoes are graded in the field. In grading for the market it is best to use only two grades. The requirements for these grades should be very rigid if we are to build up a reputation for marketing high quality sweet potatoes.

The leading county in South Carolina for the production of sweet potatoes is Orangeburg. Lee and Kershaw counties are also outstanding. These counties have adopted the Louisiana Unit One strain, which is the primary reason for their leadership. This strain has a more desirable color—copper red skin and salmon pink flesh. It is a better yielding strain than the seed stock of any native strain found on the average South Carolina farm.

It is a definite aim of the Clemson College Extension Service to make the farmers in South Carolina more "sweet potato minded." With the improved strains and cultural practices sweet potato growing will definitely be made more profitable than it has previously been.



## COKESBURY CONFERENCE INSTITUTE

*Continued from page five*

religion. His stay was short but his impartations were lasting. After a few short years of teaching he was succeeded by a Mr. Tilden, also a northerner, who was soon replaced by one of Olin's students, Adam Crawford.

Settlers came in increasing number to upstate South Carolina, after 1820. Preference for the higher altitudes led the patrons and trustees of the church and school to select a new site, two miles north of the original one. A town was carefully planned on Mount Ariel, and the school was given a favored position. Lots were offered for sale and were readily purchased by planters seeking a more healthful environment and the fellowship of congenial, Christian people. The school was opened at the new location in March 1826 with a rush of students from all directions. The increase in enrollment was so rapid that the trustees hastened to erect larger buildings. Rev. Joseph Travis, former Presiding Elder of the Ogechee District headed the new school, and it flourished under his administration. Teachers for female students were employed from the beginning of the Mt. Ariel school, and eventually a separate female school was headed by Dr. Joseph Cottrell. Both schools were apparently prospering when they were turned over to the South Carolina Methodist Conference in 1835.

In 1832 the South Carolina Conference became participant with the Virginia Conference in Randolph-Macon College. The benefits of that institution could not be enjoyed by many South Carolinians because of the then excessive distance, and the need of at least a preparatory school was felt by the Methodists of the state. As a consequence, a resolution was passed in 1833 providing for the selection of a site for such a school in this conference. Mount Ariel, in the opinion of the committee on site, was ideally situated. For long the community had been a gathering place or rallying point for Methodism, and, in addition, an atmosphere of culture and refinement prevailed. The people of Mount Ariel agreed to give \$6,000 including the two academies and the lands connected with them, if the conference school would locate here. The offer was accepted and, in January, 1835, the trustees of the Tabernacle School ceded the school property to the trustees of the conference school. Buildings and a new campus were not completed until 1836, but classes were conducted in avail-

able buildings during 1835. The official name of the conference school was, The Dougherty Manual Labor School, so named in honor of George Dougherty, to whom the South Carolina Conference owes the first inspiration for educational ambition. The village name was changed with the advent of the conference school, to Cokesbury, honoring Bishops Coke and Asbury.

Manual Labor Schools enjoyed an era of prominence during the years between 1830 and 1840. In addition to solving a disciplinary problem, student labor offered a partial means of financial support to communities desiring educational institutions. The Cokesbury institute required three hours of work per day of all students and was, thereby, able to hold educational expenditures to a minimum. Financial difficulties constantly harassed the school, and portions of land were frequently sold to remove deficits. Student aversion to work brought considerable criticism upon the manual labor system, and it was eventually discontinued with a consequent increase in tuition fees.

The session of 1854 opened with little of the original plant in order. The main building had been condemned and torn down, and without dormitories a central boarding place was impractical. A little chapel with two class rooms was being built.

Enthusiasm for education did not wane despite adverse circumstances. Day students enrolled in considerable numbers and graduated with the usual reputation of thoroughness in education. The war years reduced the enrollment to a pitiful ten and depleted the endowment of eighteen thousand which George Hallway had created in 1846, but with peace the school revived. In 1875 the consent of the South Carolina Conference was obtained to make an exchange of the property of the conference school for that of the old Masonic Female Collegiate Institute, which was established at Cokesbury in 1854. With better facilities the school once more went forward and in 1882 was opened to girls, but if they ever enrolled there is no record. Public education in South Carolina was coming into its own by this time, and the heyday of private schools had passed. However, the Cokesbury Conference School was not discontinued until 1918. At that time the building was sold to Greenwood County and has since been used as a public school.

Cokesbury was never a college, but Methodist boys of the state went there to receive preparation for life without any thought of further education. The curriculum was never broad,



but the intensity with which study was pursued is commendable. Students entering college from Cokesbury seldom encountered difficulty and numerous are the successful alumni. Ministers, physicians, dentists, lawyers, teachers and journalist of great renown are on Cokesbury's Alumni roll.

This school, under whatever name—Tabernacle, Mount Ariel, Dougherty, Manual Labor, or Cokesbury Manual Labor School, deserves a prominent place in the educational history of South Carolina. Arising in an age of educational insensibility, Cokesbury prospered and set a standard during a great era of private schools to eventually give way to an improved public school system.

— THE AGRARIAN —

### THE COVER

The cover picture of this issue is a reproduction of the famous painting, "The Angelus", by Jene Francois Millet. Millet came from peasant stock and as a boy he worked hard in the fields with his father. During this time he came to love the soil and the simple life it afforded. He was the first of the great artists to paint the peasant, not as a sort of "stage property" in a landscape, but as he truly lived and moved.

In this painting two peasants, a man and a woman, are at work in a field. They hear the bells of the Angelus from a chapel, seen in the background. They rise, stop work, and standing bareheaded with downcast eyes, repeat the prayer, "*Angelus domini nuntiavit Mariae*".

— THE AGRARIAN —

Bacteria frozen in ice die from being crushed rather than from cold.



Sign on a Newton County, Mississippi Farm

### DAVID R. COKER, LEADER

#### OF SOUTHERN AGRICULTURE

*Continued from page three*

before the boll weevil came to this part of the country David R. Coker had already laid plans to combat it; and how? By developing an early maturing variety of cotton that would be made before the Boll weevils ravages later on in the season. But Mr. Coker was not satisfied with just this, so his next step was to develop a system of poisoning that would further combat the boll weevil, and at the time of his death in 1938 he was striving hard to effect a southwide program for poisoning with governmental aid.

David R. Coker is known today primarily for his work in cotton but, nevertheless, he did valuable research in other crops, and in the future it is very probable that this latter work of his will prove to be of as much importance to agriculture as that done with cotton. At the time Mr. Coker began his plant breeding work many farmers contended that small grains could not be profitably grown down South, but Mr. Coker believed otherwise, so he began experimental work along this line. As a result of this work Mr. Coker developed wheat and oats that were resistant to the diseases and pests which formerly checked the normal development of these grains, and he also developed new varieties of corn, potatoes, mellons, fruits and green vegetables which were adapted to Southern farm conditions.

As Mr. Coker succeeded in developing new varieties of economical crops more and more attention was paid to his work. In later years thousands of farmers, as well as Scientists, Sociologists and high governmental officials from this country and abroad, were attracted to his seed farm annually to observe the methods he used to develop new varieties of Staple cotton, small grains and vegetables. Shortly before his death Mr. Coker said: "Nothing is so important in the production of farm crops as knowledge of the quality of the planting seed and their ability to produce both quantity and quality."

In the passing of Mr. Coker, this State and Nation has lost one of its foremost if not the foremost leader in the realm of plant breeding. He was the Gregor Mendel of his day and his name will go down in history as a landmark in the field of agricultural progress. A former governor of this state has very well summed it up by saying: "What South Carolina needs is more David R. Cokers."



## The Clemson Soy Bean

The Clemson soy bean originated as a result of some work done by the South Carolina Agricultural Experiment Station in cooperation with the United States Department of Agriculture. The seed of this bean was introduced into our country from China some years ago by the United States Department of Agriculture and was sent to the Sandhill Experiment Station, Pontiac, S. C. for trial as a possible improved variety for this state. This bean was tested for about eight years at the Sandhill Experiment Station, and it made such a good showing that it was given a name. As Clemson College was the center of Agricultural activity in South Carolina, this bean was given the appropriate name—Clemson.

After the Clemson soy bean was acclimated for about eight years at the Sandhill Experiment Station, it was brought to the local station at Clemson College, being grown there first in 1938. This bean was found to be well adapted to Piedmont farming conditions, as is well shown by the fact that it ranked highest in yield of twenty-four varieties grown in 1938 at Clemson. This crop is being grown at Clemson College now largely to demonstrate its value in Piedmont Soil Conservation Programs, but the fact that it is also adapted to Coastal Plain conditions has been demonstrated by the experiment stations located in that part of the state.

By growing soy beans on a soil and then turning them under as a green-manuring crop, a three-fold effect is obtained—the growing crop tends to minimize soil erosion; organic matter is added to the soil; and as this crop is a legume, Nitrogen is added in appreciable quantities. In addition to its soil-improvement qualities, it should be added that this crop makes very high quality hay when used for that purpose, and this is well manifested by its ever increasing popularity in every section of this state as a hay crop.

When the Clemson soy bean is used for hay, however, it is advisable to cut it early with a mower, then dry it, and thresh it with a grain thresher instead of using other methods of harvest, because this bean has a tendency to shatter in the field under unfavorable climatic conditions. Another method which has also proven to be satisfactory is to harvest this bean with a combine as soon as the first beans begin to shatter in the field.

## SANTEE-COOPER POWER

### AND NAVIGATION PROJECT

*(Continued from page six)*

“juice” as new units), if industry begins to modernize on a big scale the utilities may have to step lively to keep up.”

In the carrying out of the idea of malaria prevention and setting up adequate sanitation facilities, the Authority has provided for a health and sanitation division of highly trained and experienced experts, and these experts are experimenting with a revolutionary system of malaria control, using a biological method. In other words, this method, if perfected, will eliminate biological and botanical conditions favorable to malaria-carrying mosquitoes through the mopping up of their breeding places and by eradication of certain vegetation upon which these mosquitos feed and the conditions under which they breed. It is believed that by the successful inauguration of this new method the Santee and the Pinopolis basin areas will be freed of a disease which has menaced them during the past two hundred years and will be made as healthy as any region in the Southeast. Upon the carrying out of this idea, the Authority, in collaboration with the State Forestry Service, proposes to make this disease-freed land one of the fine playgrounds of the Old South with hunting, fishing and aquatic sports predominating.



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# Agrarian Personalities

## R. L. ARIAIL, JR.

"Bob" Ariail, Editor-in-Chief of THE AGRARIAN . . . Alpha Zeta, National Honor Fraternity . . . International Relations Club . . . Social Science Forum . . . Calhoun Forensic Society . . . S. C. Press Association . . . Cadet Captain, Battalion Executive . . . Majors in Agricultural Economics . . . Doesn't jitterbug . . . Reads editorials . . . Keeps scrap book . . . Collects pipes . . . Listens to Kay Kyser . . . Hunts . . . Collects old guns.



## R. H. BRYANT

"Dick" Bryant, Advertising Manager of THE AGRARIAN . . . Chancellor Alpha Zeta, National Honor Fraternity . . . Vice-President of Peedecans . . . A. S. A. E. . . Freshman track team . . . S. C. Press Association . . . Majors in Agricultural Engineering . . . Likes jitterbugging but can't . . . Smokes cigars . . . Cadet First Lieutenant . . . Likes football . . . Reads newspapers . . . plays baseball . . . Collects souvenirs . . . Bridge shark . . . Sits up late . . . Sleeps late.



## R. L. HEARON

"Skeet" Hearon, Associate Editor of THE AGRARIAN . . . Secretary and treasurer of the American Society of Agricultural Engineers . . . Smokes a pipe . . . Dances well . . . Hobby, learning unusual words . . . Boxing team . . . Hunts . . . Likes to play bridge . . . Reads ESQUIRE . . . Shoots pool . . . Literary minded . . . Prefers blondes . . . Calhoun Forensic Society . . . Majors in Agricultural Engineering.



## R. C. WANNAMAKER

"Dick" Wannamaker, Managing Editor of THE AGRARIAN . . . Vice-President of Kappa Alpha Sigma . . . Hails from the "low country" . . . Bridge fiend . . . Enjoys football . . . A pipe smoker . . . Prefers Artie Shaw . . . Majors in Agronomy . . . Likes to travel . . . Covered eight thousand miles last summer . . . Reads Shakespeare . . . Likes politics . . . Plans to go to The Argentine after graduation . . . Earnest golfer.





## THE PURINA EXPERIMENTAL FARM

*Continued from page fourteen*

the requirements are made, labeled with a number and sent to the farm for feeding trials. The feeders at the farm know absolutely nothing of the composition and feed it according to directions. If, after a period of time, a mix proves satisfactory and profitable, it is fed for a period of three years to the specific age and type animal for which it is intended, and under various conditions. If, at the end of this period, it has proven profitable and economical without any exceptions, it is made into a standard mix and put in the checkerboard bag for sale on the market.

The conclusions reached from the experiments on this farm are not published as the Agricultural Experiment Station bulletins are. It may seem to some that no contributions in the field of nutrition could be made from work on this farm, but, actually, many valuable conclusions on the value of different feedstuffs in animal nutrition are reached.

— THE AGRARIAN —

## BETTER SEED TO PLANT

*Continued from page fifteen*

One acre out of every 6, or 250,000 acres, planted to cotton in South Carolina in 1937 was planted in seed treated with a mercury dust known under the trade name of Ceresan.

"It is conservatively estimated that 400,000 acres, or approximately 30 per cent of the 1938 cotton acreage in the state, were planted with treated seed, and on the basis of results obtained from demonstrations this brought about an increase of around \$2,000,000 in the value of the state's cotton crop," says W. C. Nettles, S. C. Extension entomologist. "During 1939 equally outstanding results were secured by seed treatment. The survey as to the number of bushels of seed treated in 1939 indicates that around two-thirds of the state's cotton acreage benefited by this practice."

While this 2 per cent Ceresan (ethyl mercury chloride) has proven a great boon to farmers, and has made millions of dollars for them, it may be due for a decrease in usage—but only because another product which research men and manufacturers believe is equally as effective, and probably more so, is being put on the market.

This is NEW IMPROVED CERESAN (ethyl mercury phosphate), which has been used in treating various grains for some time. Workers in the research department have, through scientifically conducted experiments and demonstrations areas all over the Cotton Belt, found that NEW IMPROVED CERESAN is just as good, or even better for cottonseed treatment than regular Ceresan. When farmers begin using it on cottonseed it will simplify the seed treatment problem considerably, because **this one chemical can be used for treating cotton, oats, wheat, rye, and possibly some other small grains.** This seems to be a method of seed improvement which every farmer can use—in fact, can't afford not to use.

JERSEY BREEDERS

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★ **WHAT OF THE WAR IN EUROPE  
AND OUR NATIONAL ECONOMY?**

*Continued from page eighteen*

Yellow Truck and Coach; 11,000,000 bushels (7 1-2 per cent of the U. S. crop) of soy beans. The principal buyers are, in order, Russia, Turkey, France, Holland and non-belligerent nations. So, one can readily see that the orders, although not large, are mostly for war materials—shells, etc. This is diverted demand. Men will flock to these industries for work, but when the war is over, these industries will collapse, and these men will have nothing to do. Unemployment will be even greater than ever.

What are the immediate results? 130 vessels of 860,000 tonnage, and thousands of seamen are idle; there is an increased interest in the South America market, which is already a serious threat to American Agriculture; there is a loss of England's normal demand of \$150,000,000 for staple products, for these can be bought in nations granting credit; there is an increase in wage levels in war boom industries with which others must compete for labor, but cannot compete for market. As a result many industries may have to close down because of their inability to meet the wage level set by the war time industries. Mal-adjusted production will become even worse than ever, and more unbalanced it becomes, the longer it will take us to balance things up again.

The final result will be that America will become the "Shylock" in the eyes of other nations. Temporary prosperity will collapse with even more biting effects than in 1929.

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South Carolina

THE GOVERNMENT AND THE LAND

*Continued from page fourteen*

World peace is menaced by the desire of one nation for another's land. It would seem that one of the most important problems today is the improvement and conservation of existing land resources. It is hardly likely that it will be profitable for private capital to attempt a program of conservation since this involves a long-time viewpoint. This program must be a part of the public activity.

It would appear, therefore, that the government must incorporate in its land policy certain measures, which, although they may interfere with private property rights, are to the advantage of general public welfare.

THE AGRARIAN

Any John Smith, whether he be a farmer or a government, who can find joy in the prospect of losing only half as much next year as he is losing this year has mastered the sublime art of being happy though broke, perpetually.



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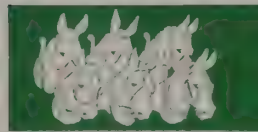
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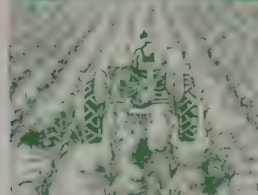
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# The Agrarian

OFFICIAL STUDENT PUBLICATION

VOL. II



NO. 2

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# The South Carolina Experiment Station

*South Carolina, the birth place of modern agricultural investigation in America, and the home of many early societies, is now served by several efficient experiment stations.*

By JESSE M. BAKER, '40

IT IS COMMON KNOWLEDGE of every South Carolinian that this state has an illustrious historical background—that the gallant soldier, Francis Marion, and his small band of Carolinians defeated the British with pitchforks; that South Carolina was the first state to secede from the Union; that the first shot of the War Between the States was fired from Fort Sumter. However, relatively few people realize that this state is the birth place of modern Agricultural investigation in America.

In 1669, the Lords Proprietors sent an expedition, under the command of Joseph West, to settle on Ashley River which is memorable because of the provisions made for the fostering and encouragement of Agriculture. West was instructed to stop at the Barbadoes and procure a supply of seed which were to be used by his expedition in establishing Agricultural production in the new world, and among the seed brought over on this expedition were found two of our common crop plants in South Carolina today—cotton and sugar cane. West was given orders to take special care of all materials that he brought from the Barbadoes, and that the "first efforts at culture should be experimental" to find out the soil to which each species of plant was best adapted and the season of the year

most favorable for planting. From all available records, this testing garden on the Ashley appears to be the first experimental farm in America.

Later on, organizations were established in South Carolina for the purpose of bettering agriculture. The Agricultural Society of South Carolina was founded in 1785 for the purpose of "promoting and improving agriculture and other rural concerns." In a like manner the Pendleton Farmers Society was established in 1815, and today, still in operation, this society has the distinction of possessing the oldest farmers hall in the United States. On the roll of the Pendleton Farmers Society is found the name of a South Carolinian who was very instrumental in founding the present agricultural system in the United States, and who was the founder of Clemson Agricultural College. This pioneer and agricultural leader was Thomas Green Clemson. His keen interest in the improvement of agriculture is shown by the following toast which he offered at the annual dinner of the Pendleton Farmers Society in October 1843: "In the absence of Marl, permit me to propose to the Citizens of Pendleton, a more familiar acquaintance with the effects of the application of Potash, Soda, and

continued on page twenty-nine



# Milk, The Perfect Food For Athletes

By J. E. BLESSING, '41

IT IS TRAINING SEASON for the athletes. The coach must first plan the meals for the team. This job is not an ordinary one because what the athlete eats largely determines the time which is required for him to get in shape. The coach must consider many factors when he is selecting the food for his team. He must consider the time they are to be in training, the time they have to prepare for the first game, whether his players are over weight or under weight, and most important of all, the food value of the food and its palatability. He will also have to consider the price of food.

The athlete must supply his body with enough food to rebuild the worn out tissues, and give himself energy to carry his body through the rigors of football or basketball. This requires a large amount of food; therefore, the more concentrated the food, the better it will be for him. He is unable to practice or play his best if he is full of bulky food. To avoid this, the coach must supply the player with food that will be easily digested and also contain the essential elements and vitamins. Along with the food elements, the body requires lots of water to replace that which is lost by perspiration during practice. Science has proved that milk will supply the water, nutrients, and vitamins required. Because of this, milk is considered by the coach and the trainers as the most perfect food with which he can supply his team. This is the reason why milk is so often used as the base food for the athlete's training table.

In considering the essentials of a well-balanced diet for the athlete, we find it necessary to provide food which contains fats and carbohydrates to produce the fuel constantly needed by the human machine. It must build, repair and replace body tissue; possess ash or minerals to construct bone and assist in various body processes; it must contain the vitamins which are indispensable to growth, strength, health and vitality; it must have fluids as regulators and carriers; and finally, the well balanced diet should be palatable, colorful, and properly prepared. The essentials are called for in the athlete's diet to a greater extent than in the diet of the ordinary person, because he requires a larger supply of energy and a larger quantity of those

foods which will supply nourishment for the maintenance of his body tissue during the practice and playing season. According to laboratory analysis, milk contains about 87 percent water and 13 percent solids. It is from these solids that fats, carbohydrates, proteins, vitamins and minerals are received for use in the body. From one quart of milk, the body may obtain 680 calories, one fourth the total amount which the average person needs per day, and the water in the milk serves to restore the moisture expelled by perspiration during practice.

There are those who think that milk is hard to digest, but when milk is compared with other foods it is found that it digests easier than the average food, which requires two hours to digest and leave the stomach. This was the reason that many coaches did not give it to their boys before the game. This is no longer true, because they know that it is a good source of energy. It is not bulky and heavy and when drunk two to three hours before game time, will not harm the athlete.

Because of its food value and palatability, milk is the basic food on every training table. It will be given to the athletes in some form every meal including those on the day of the game. For example, while the Clemson football team was in Dallas for the Cotton Bowl game with Boston College, they had one pint of milk each meal, and were permitted to have more if they desired. The Clemson team consumed more than a quart per player per day throughout the entire season. Although the team was not given milk to drink for lunch it was used for preparing soup, which means that every meal the football team had milk in some form. It has also become a practice in high schools to give the boys milk to drink after practice, because some of the boys are from families which do not have milk, or cannot afford to buy it. Before this practice was started, many boys were not receiving the proper food for their growing bodies.

Milk, deficient in only copper and iron, is the only food produced by nature to be used solely as a food. These, however, may be easily supplemented through green vegetables and fruits. Since milk is the best food for the training table of athletes, it is reasonable to assume it must be good for everyone.

# Livestock vs. The One-Crop System

By E. P. HUGUENIN, '42

... With much of the land extremely acid, and with much of the best soil on the bottom of the Atlantic, South Carolina farmers find it difficult to produce enough to feed their stock.

HAVE YOU READ Secretary Wallace's Report for the Year 1939? It can be seen from his following statement that the future of cotton is far from bright: "The total returns from the 1938 cotton crop, even with the federal payments, were only half as large in relation to the national income as the average of the five years immediately prior to World War I" In 1939 farmers received an even smaller proportion of our national income. It certainly looks



Fences save the soil

as if the days of our cash crop, King Cotton, are rapidly drawing to a close. What is the answer to this problem? What can the South turn to that will enable it to supplement an all too meagre income? The livestock and poultry specialist have been continually hammering into our ears—"why not try that well-known trio—the hog, the cow, and the hen?" And indeed! Why not? It is our sole remaining hope.

Something has to be done and done soon about our southern soils. These soils have grown cotton and tobacco, the acid-tolerant crops, so long that they can grow little else. From tests made on over two million soil samples taken from different sections of South Carolina, it was learned that approximately 40 percent of the agricultural lands in the state are so extremely acid that they are not capable of producing a sufficient income for a satisfactory standard of living.

Another 40 percent of the land was found to be of moderate acidity which will enable cotton and tobacco to be produced profitably only after large amounts of fertilizer have been applied.

Only about 20 percent of the cultivated land was found to be of a low enough acidity to support a profitable live-at-home program. A very

large part of our agricultural profits are derived from this small percent of our available land.

"It is recognized that South Carolina can no longer depend solely upon cotton and tobacco as the foundation on which to build a strong and permanent civilization. A more diversified system of agriculture is needed including a wide variety of high grade food crops necessary in the production of farm animals."

From the viewpoint of each farmer, livestock raising has a great many advantages with which everyone should be familiar. Among the advantages the following are significant: (1) The control of erosion; (2) the maintenance of soil fertility; (3) the amount and distribution of labor; (4) the distribution of income; (5) the reduction of living expenses; (6) the added market possibilities. Do cotton or tobacco do any of these things? Let us see.

Cotton is one of erosions best and dearest of friends, water flowing through a field of cotton finds very little resistance since the cultivation is so completely clean. Among the various distinctions of cotton and tobacco, returning fertility to the soil is certainly not among them. The

continued on page twenty-five





# Civil and Political Status of the Southern Negro

## History and Significance

By R. C. WANNAMAKER, '40

*The "Solid" South can never obtain political justice . . . Southern policies regarding the Negro are prominent factors in maintaining this uni-partisan system . . . the South must throw off these delusions and open the door to a bi-partisan system before it can obtain a position of leadership in national affairs.*

WHEN THE FIRST NEGROES were brought to South Carolina and the rest of the South, there was no such prejudice against them as afterward developed. Slaves were well taken care of, and there were few cases of bad feeling of the master for his slaves. The free Negro had the privilege of voting, of owning property, and many other privileges, originally. In the period before the War Between The States (around 1800) these free Negroes were gradually deprived of many of their privileges because the planters lived in constant fear that they (the Negroes), because of propaganda spread by various groups, would become centers of infection for insurrection. The northern states were equally drastic in dealing with free Negroes, and nearly everywhere the vote was taken from them, freedom of movement was limited, they were not permitted to testify against white people, they could not buy or sell except under certain restrictions, they were not permitted to assemble freely, and in some states they could not preach the Gospel except in the presence of at least one white man. They could not be taught to read and write, and in many northern states the chance to make a living was practically denied. All of this was brought about to counteract the propaganda spread by the organizations of the rebellion-mongers.

### War Gives Birth to New Society— Caste Modifications and Shifts in Power Made

At the close of the War Between The States a new situation arose. There were, then, four classes of society in the South. First, there were the planters, an aristocratic class who up to this time had dominated the social, civic, and political life of the section. This landed group was completely bankrupt at the end of the war. Their slaves were freed, they could hire no laborers, their tools and estates had been burned or had deteriorated terribly during the war, and

they had no capital and no means of getting any. The outlook for this group was indeed black.

The second class was the poor whites. The war had helped them because they hadn't anything of value to be destroyed, and now that slaves no longer had a monopoly on labor, they could get some work. This class, in general, was resentful towards the aristocrats because of their attitude of superiority and contempt towards the less wealthy class. These people also had a feeling of animosity toward the freed men, because their own degraded status had been fixed by these Negroes during the era of slavery. This group definitely had no desire to see the Negro acquire political power.

The third class was the Negro who had been free before the war. He had always had limited civil privileges, but just prior to the war had lost most political privileges because of the fear that he would stir up insurrection. The end of the war cleared the way for him to enter into political power as leader of the newly emancipated slaves.

Lastly, there were the slaves just set free and now known as freedmen. This group was ignorant and had had, in general, only two types of training—agricultural, and the little mechanical training which was acquired about the plantation. Many of them wanted to remain on the plantations, but the majority did not want to remain, and there was nothing they could do in the towns. Hence, they became wandering homeless people, without responsibility and subject to little government control.

There was what should probably be designated as a fifth class—the Scalawags (southern men who had stayed out of the Confederacy in the hope of preferment by the Union, or for other selfish reasons) and the Carpetbaggers (men who came in from the North to grab the political offices and profit from the spoils of the Union regime). This type of man was eager to become

continued on page twenty-six



# The War Between The States

By E. W. COOLER, JR., '41

**M**OST OF US think that the Civil War ended in 1865, but actually we have never stopped fighting one another. The hostilities have a little different aspect now, however. During the Civil War it was North against South, with the states on each side more or less united. Now it is each state for itself with little respect for the other's laws, economic welfare, or social problems. Each is trying desperately to promote its own selfish aims, even at the expense of its neighbors, if necessary.

For instance, a Georgia merchant just across the Florida State line cannot sell eggs from the latter state, and call them fresh, no matter how fresh they really are. Of course consumers don't want stale eggs, and consequently few Florida eggs are sold in Georgia.

An Iowa farmer started to the Chicago market with a truck load of vegetables, and had not gone very far before he was stopped by a patrolman who told him that he would have to put two green lights on the rear of his truck. He did this, but no sooner had he crossed the state line than an Illinois patrolman stopped him, saying that two green lights on the rear of his truck was a violation of the law. Besides being fined for this he was also fined for having three or four inches too long a body on the truck.

It so happens that a certain butter-producing state and an oleomargarine-producing state have a common border. The butter-producing state passed laws prohibiting the sale of oleomargarine, and the other state retaliated by passing laws to restrain the sale of butter within its borders. How much better it would have been if they had cooperated. Each is restricting the other's commerce, thus limiting both markets, and reducing production. Consequently, both are suffering instead of profiting.

These are only a few of the examples of the incoherence of our state laws. There are many such examples. However, there are demonstrative of the fact that we have not yet come to a full realization that we are forty-eight united states, not just forty-eight states of America.

Before the Revolution each colony was directly connected with the crown of England, but few, if any, had any relations among themselves.

The crown pulled the strings that made each puppet colony act, and on the stage America the puppets rubbed against and trampled each other as if dangling from one control point, London.

It is essentially the same today. Instead of the crown we have our federal government and instead of the colonies we have the states. But we have the same stage, larger now, and more puppets. Our "show" is a little more united and coherent now, but we still rub against each other, we step on our neighbors' toes, we trample on the weak, and altogether our "show" is not going over as well as it should.

Although it is better organized than many of the other "shows" of the world, we still lack one thing—a strong bond between all of the states, a thing that is absolutely necessary for perfect union. If we had this strong bond, the federal government could still pull the strings, but instead of a few states responding to the stimulus, all of us would respond. After all, no organism can function properly without full cooperation of all of its parts.

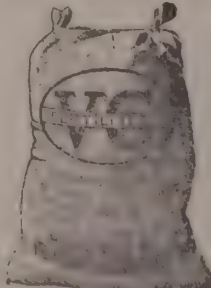
It is the duty of every citizen to see that the federal government creates a stronger bond between the states, that it organizes their laws regarding interstate commerce to a point where goods can flow freely from all points of production to the points of consumption. In all, it is our duty to see that this union is made into something meaningful and coherent so far as we are economically and socially concerned. Until this is done, we can never expect economic adjustment to reach its maximum efficiency.

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# The Farmer Owns The Property

By B. W. ANDERSON, '41

"In the field of agricultural finance, mortgages and taxes are the two most prominent elements. Both are necessary, and they are here to stay. But need they be so arranged that they lead to undue hardship and therefore to soil misuse? Or is it possible to revise both mortgage and taxation methods so that they encourage better use of the land?"

—From the 1938 Yearbook of Agriculture, Soils and Men

Since the early days property has been the bases of tax revenue for local government and real estate the principal form of property. Relying on figures contained in "Tax Systems of the World", property taxes account for nearly two-thirds of all state and local tax collections in the United States, and approximately two-fifths of the total including Federal revenue. In South Carolina 50 percent of total tax collections were received from the property tax.

Property tax in form of real estate owned mostly by farmers is not only the principal source of revenue but in many states personal and intangible property have all but disappeared from the tax rolls. In South Carolina about one-fourth of all taxable property is represented by farm lands and buildings and when city and town real estate is considered the figure approaches one-half. The Bureau of Agricultural Economics, U.S.D.A., estimates that nearly two-thirds of the farmer's tax dollar is accounted for by taxes on farm real estate.

Property tax has least planning of any other tax at present time. Less than ten states have a comprehensive classified property tax system and only a few have endeavored to recognize more than one class of property. This causes inadequate property tax legislation and a maze of assessment practice and procedure. Here are some examples:

(a) The unit for assessment in South Carolina is the school district; while in Georgia, Florida, Alabama, Mississippi, North Carolina and Tennessee it is the county.

(b) Assessors are elected in Alabama, Florida, Mississippi, and Tennessee but appointed in South Carolina, Georgia and North Carolina. The appointment is by the Governor upon recommendation of the county delegation in South Caro-



lina, and by the county commissioners in Georgia.

(c) South Carolina, Georgia and North Carolina make use of a board of assessors while Florida, Alabama, Mississippi and Tennessee are content with a single assessor.

(d) Assessors are paid a per diem in South Carolina, Georgia and North Carolina, but are paid salaries in Mississippi and Tennessee and receive a commission based upon the value of properties assessed in Alabama and Florida.

The farmer is now facing a most serious condition because he, like all other taxpayers must pay his taxes out of revenue from "rent, profit or wages". It is more difficult to assess or measure the taxpaying ability of a farm than it is of any other types of property. Farm property values depends greatly upon fertility, productivity, and prices. While on the other hand farms are subject to unusual weather conditions, insect injury and disease. Also on certain types of farms (for example timber) long periods elapse before any cash returns are realized "The

continued on page twenty-one



# The Appraisal of Farm Tenancy in South Carolina

## GUEST EDITORIAL

By DR. B. O. WILLIAMS

**A**NNUALLY in South Carolina, during the last few days of the old and the first few days of the new year, a great movement of population takes place.

Fathers and mothers, together with their children, put their bags and baggage in wagons and trucks and move from one farm to another. These people are, for the most part, tenant farmers. They are white tenants and colored tenants, even a slightly higher proportion of the former than of the latter.

In fact, about one in every four tenant farmers changes his residence each year. This condition is appalling, when viewed in the light of its relation to the art of successful farming. It is especially significant in its relation to the possibility of controlling soil erosion. Likewise, the condition is highly important in relation to the community institutions, to the church, to the school, to the credit agencies, and to the neighborhood life in general.

One does not need to have extensive experience in farming to realize that such a condition is not conducive to a sound and constructive system of agriculture. The fact that 47 percent of the tenant farmers of South Carolina in 1935 had been living on the farm they were then living on for only one year or for less than one year, should challenge the interest and thought of all concerned in the future of the state. In other words, of about 100,000 farm tenant families in the state in 1935, some 47,000 families had been living on the farms on which they were then living for only one year, or for less than a year. This probably represents more than a quarter of a million persons.



DR. WILLIAMS

Research findings which I have recently tabulated in the Clemson Experiment Station indicate that tenancy seems to beget tenancy. The study was made of 1,830 farm families in eight counties. There were 515 white farm owner families in the study and 531 white farm tenant families.

The data were analyzed to see what had happened to the tenant families over three generations. Only those representatives who were employed in farming at the time of the study were included in the present analysis, since it was desired to determine the tenure status in farming. There were 368 children of the white tenants and 513 children of the white owners working in farming. We will call this group the first, or youngest generation. Similarly, there were 1,987 brothers and sisters of the white tenants and 1,830 brothers and sisters of the white owners employed in farming. Let us call this the second, or middle generation. And there were 498 fathers of the white tenants and 480 fathers of the white owners engaged in farming. This we will call the third, or oldest generation.

Here is the way in which the tenure status was distributed over the three generations from which the white tenant farmers were selected: 71 percent of the first generation (children) were tenant farmers; 72 percent of the second generation (brothers and sisters) were tenant farmers; and 44 percent of the third generation (fathers) were tenant farmers. Even the latter figure for the third and oldest generation is higher than the proportion of tenancy in the farm population of the United States as a whole. **These figures show that almost three-fourths of the children of the white tenant farmers were tenants; that almost the same proportion of these children's uncles and aunts were tenants; and that almost half of their grandfathers were tenants.**

By comparison the tenure status represented by the white owners in the study was distributed over the three generations as follows: 49 percent

of the first generation (children) were tenants; 19 percent of the second generation (brothers and sisters) were tenants; and 13 percent of the third generation (fathers) were tenants. This shows that a much lower proportion of the children of white owners were tenants than the children of white tenants, and that the same was true for the brothers and sisters and for the fathers. Tenancy would thus appear to be a stepping-stone to ownership of farms for the children of owner farmers, but not to any great extent for the children of tenant farmers. To emphasize this, it might be pointed out that more than a third, or 37 percent, of the children of white owners (first generation) were owners of farms; that 80 percent of the brothers and sisters (second generation) were owners; and that 87 percent of the fathers (third generation) were owners of farms. Only 10 percent of the children of white tenants (first generation) were owners;

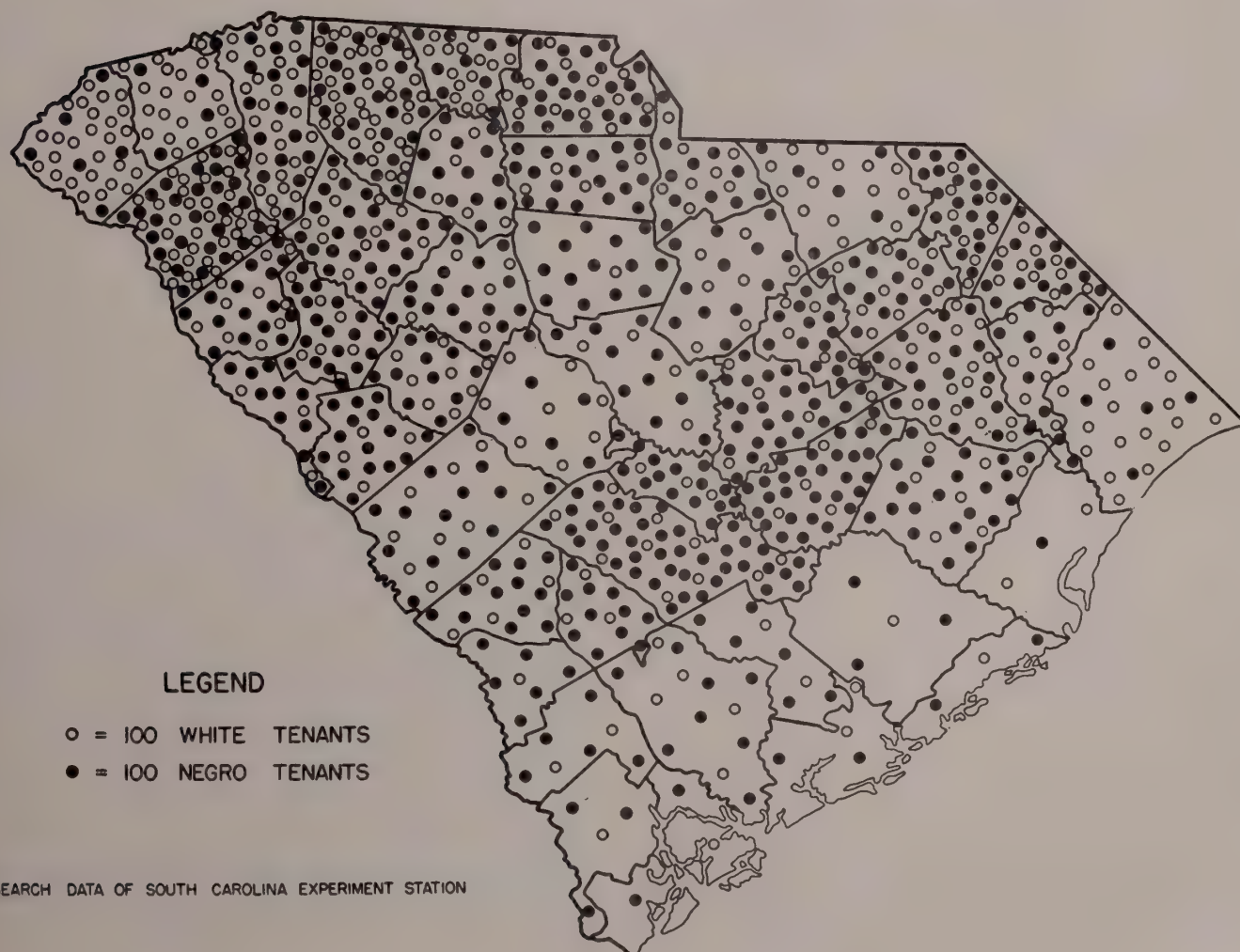
only 26 percent of the brothers and sisters (second generation) were owners; and only 56 percent of the fathers (third generation) were owners. (Some of the representatives in the various tenure classes were hired persons working on farms, but these are omitted in the present analysis. This is the reason that the totals do not always add to 100 percent.)

Thus over three generations there appears to be a strong tendency for the children of tenants to follow in the status of their fathers. And, whereas the children of owner farmers often begin their careers as tenants, there is a strong tendency for them to achieve the status of owner later on in life.

Of every three farm families in South Carolina, two are tenant families. This fact is of sufficient importance to command the considera-

continued on page twenty-one

### ALL FARM TENANTS IN SOUTH CAROLINA, 1930







# About This and That . . .

BY THE EDITORS



## THE ANNUAL FARM MACHINERY DAY

"In the spring a young man's fancy lightly turns to thoughts of love", so the quotation goes, and while this may be partly true with a certain group of students at Clemson, love is not the only thought it has. These students are the Agricultural Engineering majors, and it's a simple matter to tell when spring is on the way by listening to them make plans for their annual Farm Machinery Field Day.

This event has always been a successful affair and on May first this year the Agricultural Engineering Department is making plans to put on the biggest and best demonstration yet attempted. The men in charge have learned more each year how to handle the demonstration; the farm machinery and implement companies have realized the value of advertising they receive; and the farmers have learned that they are being shown the correct and practical usage of modern farm machinery.

This year the Agricultural Engineering Department has been fortunate in acquiring 30 acres of land on the Cherry Plantation. On this land will be planted some corn so that actual cultivation may be shown, and it is hoped that some grain may be planted so that mowers and rakes may be demonstrated.

With these features added to the program, and a larger area of land on which to operate, the 1940 Farm Machinery Demonstration should surpass the successes of all previous demonstrations.

—R. L. H.

THE AGRARIAN

★ A cutting of almost any kind of house plant can be easily rooted by splitting the stem and inserting an oat kernel in the slit. When planted in a pot of soil, the slip starts growing immediately.

THE AGRARIAN

★ Hens have been known to lay more eggs after the inside of laying houses were whitewashed. This is accounted for by the increased amount of light.

## OUR COVER PAGE

A Pickens County, South Carolina Negro farmer paused at the end of a row to fan his brow, and was caught as such in the magic eye of a camera by an observant passerby. He appears on our cover bearing the name **Africanus Agricola**, The African Farmer. His name, however, can be used as a term to cover a large and distinct segment of the American people. He is a familiar sight in the cotton and tobacco fields from the Potomac to the Rio Grande. He has played a major role in the glamour and tragedy of the Old South, in reconstruction and in the "Agrarian Revolution" following the Civil War, and still remains as a great factor in the Rural South.

With the introduction of cotton into this country, came the Negro in increasing numbers to follow America's greatest crop in its march to the West. By the use of his labor, there developed and prospered a great civilization, the plantation system of the South. The elimination of slavery did not destroy all the fundamental relationships between Negro farm laborers and white land owners, as the system of share cropping has perpetuated some of the most common features.

In round numbers **Africanus Agricola** totals 4,500,000 or 52 percent of the entire Negro population of the South. Consequently, this means that he must be considered in any study or program of solution of the agricultural problems of the South.

—R. L. A.

THE AGRARIAN

★ One ounce of either sulphate of ammonia or nitrate of soda dissolved in two gallons of water makes a solution which, when added to potted plants, gives them extra pep and beauty in blossoms.

THE AGRARIAN

★ Tobacco horn worms should never be killed by crushing because practically every worm is the host to internal parasites which prevents the worms reaching the adult stage and lay eggs.

# Clemson Royal Knight

By H. A. JOHNSON, '40

Clemson Royal Knight 269491, the young Guernsey bull of outstanding potentialities, now in the Clemson dairy herd was sired by Saugerities Royal Sequel 159031. Knight is therefore a half brother, by the same sire, of Cathedral Rosalie, the world's record Guernsey cow. Rosalie gained this distinction by producing 23,714 pounds of milk containing 1213 pounds of butterfat in one year. Saugerities Royal Sequel has twenty daughters whose average production is 13,520 pounds of milk per year, containing 103 pounds of butterfat.

One of these daughters had the highest record in the United States in Class BB. She was Cathedral Dorothy's Lass 368252, with a record of 18,814 pounds of milk and 1,043 pounds of butterfat. Another placed second in Class GG with a record of 16,681 pounds of milk and 847 pounds of fat. Her name was Cathedral Jane Rilma 436664. Still another, Cathedral Rose Rilma 421823, placed third in Class F, with a record of 16,881 pounds of milk and 863 pounds of fat. The record of production for all the daughters of Saugerities Royal Sequel average 44 percent above the average of the Guernsey Breed for the same Advanced Register classes.

Saugerities Royal Oneonta was purchased in August, 1936 from Mr. H. H. Bailey of Oneonta, New York, to head the Guernsey herd at the Sandhill Branch of the South Carolina Experiment Station located at Pontiac, South Carolina. The Dairy Project at this Branch Station is op-



Saugerities Royal Sequel 159031,  
the sire of Clemson Royal Knight

erated with the cooperation of the Bureau of Dairy Industry, United States Department of Agriculture.

Saugerities Royal Sequel did not become a great breeding sire by accident. He was out of a cow, Shagbark's Dorothy 117764, which produced 18,389 pounds of milk and 823 pounds of fat. The sire of this cow, Florham Laddie 20431, has to his credit seventy-three Advanced Register daughters and thirty-one Advanced Register sons. Saugerities Royal Sequel was sired by Langwater Holliston of Rockingham 67366, which has as his record thirty-one Advanced Register Daughters and ten Advanced Register sons. He was sired by the famous breeding bull, Langwater Holliston 23055, which is renowned because he produced fifty-four Advanced Register daughters and thirty Advanced Register sons. It was planned breeding which brought about the birth of Saugerities Royal Sequel, the great sire of Clemson Royal Knight.

The dam of Clemson Royal Knight is Appin's Blossom 339079, which was out of Appin's Springtime 191377, a cow with a record of 12,354 pounds of milk and 580 pounds of fat. (This record was made when she was a four-year old.) Appin's Springtime was sired by Fern's Raider of Appin's 64700, a very renowned sire, having produced twenty-four Advanced Register daughters with an average production of 9,693 pounds of milk and 500 pounds of fat. He was born

continued on page twenty



Appin's Blossom 339079, the dam of Clemson Royal Knight



# Soil Conservation On The March

*... Accompanying an awakening of the American people to the seriousness of our present land condition, a great movement against soil waste has been gathering momentum ...*

By F. E. ROGERS, JR., '41

MAN'S STRUGGLE against erosion is ageless. Since the beginning of time, races have fought it, lost, and entire civilizations have disappeared. Though for many years men have directed their ability toward the defense of the soil, if the remaining valuable acres are to be saved, conservation measures must be taken generally.

Soil deterioration is caused by three important factors or processes: leaching, crop removal, and erosion. Loss through leaching, is to a large extent dependent on the topographical features of the terrain and the climatic conditions of the region. The loss of nutrients through cropping, or the decline of soil productivity through crop removal without the return of elements used in crop production, has been considered most important. But only recently have losses through erosion been thoroughly appreciated.

Throughout the country, habit more than reason, determined the type of farming, and the successful results of experimentation had to be shown before the public became aroused to the task at hand. In carrying out a program of soil conservation, the greatest problem has been the education of the farmer. The determination of the most practical, economical, and successful methods of conservation was the work of the advocates of soil defense. Progressive farmers built terraces, but as no effort was made towards their maintenance, they often filled or broke, and were directly responsible for large soil losses.

Experience was, from necessity, again the teacher.

At early dates, contour cultivation and terracing, were advocated in the southern Piedmont, and crop rotation soon followed, but it remained for the farmers to become generally educated in the value and necessity of these practices before organized opposition to the appalling soil losses were begun. In 1932, as part of an emergency program, the Soil Conservation Service, primarily intended to be temporary, was formed in the Department of the Interior. So valuable, was its work how-



Practical field demonstrations, such as the above, have greatly encouraged conservation among farmers

ever, that in 1935 it was transferred to and made a permanent division of the United States Department of Agriculture.

In 1937 the legislature authorized farmers to organize soil conservation districts. Since then, the following have been organized in South Carolina, and are cooperating with the Soil Conservation Service:

Upper Savannah—including Pickens, Oconee, and Anderson counties

Broad River—Spartanburg, Cherokee, and Union

Catawba River—Fairfield, Chester, Lancaster, and York

Lower Saluda—Greenwood, Newberry, and Saluda

Congaree—Richland, Lexington, and Calhoun

The following are being formed:

Savannah Valley—Edgefield

Abbeville County Soil Conservation District

Greenville County Soil Conservation District

Laurens County Soil Conservation District

When organized, the districts through their five supervisors, work out their "district program and work plan", which is in three parts:

1. Conditions that exist in the district are set forth—climatic, geographic, economic, etc.
2. Proposal of the plan of action to be taken.
3. Description of how the plan is to be carried out and designation who is to do the work.

This plan is then submitted by the supervisors to the Secretary of Agriculture with a request for assistance in putting the program into effect in the district. Upon approval by the Secretary, and when funds are available, the Soil Conservation Service is then instructed to cooperate with the district by furnishing such assistance as they have available. This assistance may be limited to technical services such as the use of soil maps, or the disposal of a conservationist or an engineer to design a water disposal plan for the farm. Or CCC labor may be used to assist in carrying out a plan which has been agreed to by farmer and supervisor, by laying out and checking terrace lines, building and treating terrace outlet channels, preparing and seating strips for water disposal areas, assisting with improved pasture development, and planting trees. The Soil Conservation Service may make grants of planting stocks, such as kudzu crowns.

Soil conservation districts are not Soil Conservation Service districts, but are farmers' organizations within the districts, and the Soil Conservation Service is one of the agencies assisting in carrying out district programs and work plans which supervisors have adopted. Other assisting agencies are: Extension Service, State Forestry Commission, Farm Security Administration, U. S. Forestry Service, and vocational teachers of agriculture—all working on the same plans.



A terrace in the making



Authorities advise dust-treating seed with New Improved CERESAN to increase yield values by reducing seedling blight, smuts of oats, covered and black loose smut and stripe of barley, stinking smut of wheat. In tests, the average yield increase has been 6% on barley and wheat; 18% on oats! About **twice as economical** as other dust treatments; costs as little as 1 3/5c per bushel of seed. Treat **now** in spare time. Pamphlet free from dealer. Bayer-Semesan Company, Inc., Wilmington, Delaware.



Since the first district was organized in 1938, 1750 agreements have been written in South Carolina covering 299,398 acres, and prior to then the Soil Conservation Service had in projects, 1545 agreements with farmers, covering 644,435 acres, and had, in cooperation with CCC camps, 236 agreements, covering 372,141 acres. Through February 15, 1940, 5,531 agreements with farmers, covering 1,315,974 acres have been made. Now all agreements are handled through the districts instead of the Soil Conservation Service.

With the movement against soil waste gathering momentum, a concerted and intelligent effort to control and prevent erosion, together with individual and district protection of farm lands combined with the efforts of the state and government agencies directed toward preventative measures, seem to assure the economic and social betterment of the people as derived from soil conservation. By the characteristic resourcefulness which has stood the American people in such good stead, together with an awakening to the reality of the seriousness of our present land condition, the soil will be saved.





# BETWEEN THE

## Extension Conference

Mr. D. W. Watkins, head of the State Extension Service, attended the Southeastern States Intra-Regional Extension Conference, which was held at the Alabama School of Technology, Auburn, Alabama, February 15-16.

THE AGRARIAN

Dean W. H. Washington presided at a meeting of all freshmen enrolled in the School of Education, Monday, February 19. The meeting, which was held in the auditorium of Long Hall, was for the purpose of introducing the various organizations of the Education School to the freshmen. G. A. Stoudemire made short talks on each division, giving their activities and purposes. Also, Mr. W. C. Bowen, Adviser of the local F.F.A. made a short talk on the purpose of the collegiate F.F.A. Approximately 60 freshmen were present.

THE AGRARIAN

## Animal Husbandry Club

The Animal Husbandry Club is to sponsor a livestock show to be called the "Little International", this spring. Also, the club will sponsor a judging contest for underclassmen later this year. As one means of securing funds for starting the show, the club has the agency for a well-known oat huller.

At the last meeting, the key design was completed. Programs for the remainder of the semester will consist mainly of talks by the students.

THE AGRARIAN

## Alabama Meeting

About 45 members of the Clemson School of Agriculture attended the meeting of the Association of Southern Agricultural Workers in Birmingham, Alabama, February 7-9. A number of Clemson men were included in the various programs, and Dr. W. T. Ferrier, associate Agricultural economist, was elected chairman of the section on agricultural economics. The convention had as its themes: "The Next Step in a Balanced Agriculture for the South."

## Dairy Club

The Dairy Club members recently received their 1940 keys. Design of the key is the same as the preceding year.

One of this year's activities is the preparation of a questionnaire which is to be sent to every Clemson dairy graduate. From the answers a directory giving present addresses and other information will be compiled, and copies will be sent to each man who answers the questionnaire.

Recently, 12 cadets of the Junior and Senior classes were admitted as Junior members of the American Dairy Science Association. This is a national organization and the requirement for admission is that the candidate be a dairy major.

THE AGRARIAN

Dr. E. R. Hoskins of the Department of Agricultural Education at Cornell recently spent the weekend at Clemson. He is visiting the outstanding agricultural schools in the nation and is studying the programs used at each.

THE AGRARIAN

## Fertilizer Board Meets

Members of the South Carolina Board of Fertilizer Inspection and Analysis met here during January to attend the fertilizer inspectors' school. An extensive program was carried out, including a trip to the fertilizer plants at Anderson, and discussions were held.

THE AGRARIAN

## Conservationist Speaks

Dr. W. C. Lowdermilk, assistant chief of the Soil Conservation Service with headquarters at Spartanburg, was a recent speaker on the campus. His lecture was illustrated with colored slides made during a recent survey by Dr. Lowdermilk in England, France, Holland, Italy, Palestine, Phoenicia, Arabia, and other areas of ancient and modern agriculture in the Old World. Especially interesting were the scenes of the oldest experiment station in the world at Rothamsted, England, and the 550,000 acre reclamation project of the Zuider Zee in Holland.



## FURROWS

### Recent Publications

The South Carolina State Planning Board has issued a report on the "Fiscal System of South Carolina", by Dr. G. H. Aull, head of the department of Agricultural Economics and Rural Sociology at Clemson, and Dr. S. M. Derrick, professor of Economics of the University of South Carolina. This report contains chapters dealing with previous studies, present situation, revenue receipts, government expenditure, and the appraisal of the system.

Dr. H. P. Cooper, Dean of the School of Agriculture, has published a bulletin, "Fertilizer and Liming Practices Recommended for South Carolina".

Professor A. M. Musser, of the Horticultural Staff, presented a pamphlet entitled "Peach Trends in South Carolina", at a recent meeting of the Illinois State Horticultural Society held at the University of Illinois.

THE AGRARIAN

Under-Secretary of Agriculture, M. L. Wilson, headed a delegation of agricultural leaders who visited South Carolina in January. While here, the group held a series of meetings to discuss land use planning.

THE AGRARIAN

Recently, a grant with which to conduct a study of small-scale enterprises which might be used to supplement the incomes of South Carolina farmers was awarded to the South Carolina Experiment Station. Dr. G. H. Aull, head of the Department of Agricultural Economics and Rural Sociology, will supervise the work. The results will be published in bulletin form and issued through the extension service library.

The General Education Board recently made available to Clemson College, sufficient funds with which to employ three graduates for research work in the Department of Agricultural Economics and Rural Sociology. The men who obtain these grants will be assigned to the different members of the staff as assistants.

### Stewart Accepts Position

Eugene Stewart, mid-year graduate in agricultural economics has accepted a position as superintendent of advanced registry testing with the Clemson dairy department. Stewart succeeds Earl McCurry, who has been transferred to the position of clerk of the extension service bulletin room.

THE AGRARIAN

### DREAM'S MIRACLE

By T. E. GOODSON, '40

I'm really not a crippled boy  
Like they say I am,  
Why I play ball and tag  
As well as my friend, Sam.

I like to play baseball or tag,  
Or any other game,  
But since I've started dancing  
I haven't felt the same.

I slipped away last night at ten,  
And what a time I spent!  
I'll tell you what I did  
And also where I went.

There was the best and nicest dance  
Where ladies were my age.  
We danced and danced by music  
From a band upon a stage.

I think that I could reel and glide  
Until I'm bent and gray,  
And maybe then a waltz or two  
Would be enough each day.

I love to dip, and slide, and spin  
Upon a polished floor,  
To laugh, and talk a bit,  
Then dance and dance some more.

If you could see me waltz one time  
You'd b'lieve just what I say,  
But every time I dance  
I have to slip away.



# More Fruit By Better Pruning

By H. C. ZERBST, '41

IT IS A RECOGNIZED FACT that different regions specialize in the growing of the crops that are best adapted to these particular regions. This is because soil and weather conditions differ widely in various part of the country, and the conditions making for maximum development in one crop often prove unsuitable for the maximum development in another. Citrus fruits will grow in sections having relatively high temperatures a large part of the year as in Florida, Texas, and California, while apples grow and produce better yields in sections having low winter temperatures and fairly high summer temperatures.

Also certain sections of our state (Sandhills and Piedmont) possess excellent climatic and soil conditions necessary for the successful production of fruit, such as peaches and bunch grapes, a fact that was recognized by the pioneers.

It was not until comparatively recent years, however, that the farmers of South Carolina engaged in commercial fruit production and it was not until after 1924 that increased commercial shipments of peaches were sent to northern markets. Since that time, the peach crop has been steadily gaining importance and at present there are around three and one-half million trees in South Carolina orchards. In order to obtain the most profitable production from these orchards, the growers should strive to carry out successful and approved practices. One of the most important orchard practices is that of training and pruning.

It is particularly important that the young trees be trained and pruned properly during the years previous to bearing full crops. Proper pruning is very essential in the development and formation of an orchard. Practically all grow-

ers practice annual pruning, but many of them do not understand the fundamental principals of this procedure. They simply prune because they have heard that it is a wise thing to do, mainly because (1) it will produce better quality fruit, (2) it will increase the size of the fruit, (3) it will make the trunks of their trees grow stockier and (4) will reduce the cost of spraying, thinning and picking by not allowing the trees to grow too high. In particular, a considerable

number of them **prune their young trees too severely**, not realizing the great dwarfing effect of severe pruning and the delay in bearing that follows.

The leaves are the manufacturing centers of the tree and where **severe pruning** is practiced the potential leaf surface is naturally greatly reduced. When this is done the amount of food manufactured is **decidedly decreased**.



Trees making heavy vegetative growth, should be pruned before the next growing period

The growth of the tops and roots is greatly reduced and the trees at the end of the second summer in an orchard may be very little larger than they were at the end of the first season's growth. When peach trees are pruned in this fashion a large percentage of the vegetative buds and the comparatively few fruit buds that have formed are removed. This in turn lessens the amount of growth and fruit produced because every fruit is preceded by a fruit bud and every leaf and shoot by a vegetative bud. Thus, if the total number of buds is greatly reduced, the total amount of vegetative growth and fruit produced will be inevitably decreased.

When young trees are severely pruned, what actually happens to the food manufactured by the comparatively small number of leaves such a tree produces? When the potential number of leaves on a tree is decreased it must be remem-

bered that the root system has not similarly been decreased and, consequently, more water and soil nutrients are being furnished to the remaining growing points in the top and the growth will be much more vigorous in each of these resulting shoots. From all appearances the tree is growing very vigorously, but actually this vigorous growth is taking place in too few growing points to produce an appreciable amount of wood above the amount produced the first season and which will be productive the third season. The plant food that is being manufactured by the smaller number of leaves is immediately used in the production of new branches. Such a small amount of food is left over that the tree can not grow sufficient wood cells on the trunk and main limbs to give them much increase in thickness and very little is left for promoting root growth and few if any fruit buds are formed.

On the other hand when one year old trees are lightly pruned, that is, only enough of the branches removed so as to properly thin out the tree, and the main branches cut back just a short distance to a lateral branch to keep the growth within proper bounds, a relatively small number of the leaf buds or growing points are removed. Trees pruned according to this plan will produce a much larger number of leaves early in the growing season which will manufacture food during the remainder of that period. Many more leaves and branches will be produced on such trees and the total growth bearing fruit buds at the end of the second summer will greatly exceed similar growth of trees which have been severely pruned. In addition large amounts of food will be available for increasing the thickness of the trunk and main branches and for increasing the root system. Likewise, food will be manufactured in excess of the amount needed for vegetative growth to produce a large number of fruit buds.

By practicing light pruning, speaking particularly now of peach trees, and thus taking advantage of the food manufactured by the leaves, it is possible to obtain a crop averaging two to three bushels per tree the third summer or the first year a crop is borne. This is not only possible, but actually has been done by a few growers who use good common sense in pruning their young trees. When an individual plants a large orchard it is done with the intention of making as much money as possible. It is necessary in the majority of South Carolina peach orchards to apply considerable quantities of available fertilizers. Also essential to the grower are

cultivation and spray equipment as well as spray materials. All of these things require money. But if too severe pruning is practiced the crops received are quite small, the cost per bushel is quite high and the grower makes little if any profit.



★ In muddy weather if hens are forced to walk through a shallow trough containing whitting, the fine white powder coats the mud on their feet and helps keep the nests clean.



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## The Future of Farm Buildings

By F. E. ROGERS, JR., '41

FARMING, as other businesses, is governed by the principles of finance necessary for successful operation—minimum overhead and applied economy. Many types of agriculture are as dependent on buildings as on any other one factor, and as diversification in agriculture is being exploited and advocated as the means of restoring the southern states to their former sound economic condition, the problem of appropriately designed farm structures has necessitated serious consideration.

At present, the trend in building design seems to have been dictated by efficiency factors in the direction of "greater adaptation to a single enterprise"; diversification, however, demands a far more complex building outlay than does specialization of farm activity. The more a building is designed for one specific purpose, the harder it is to adapt the same building to some other use. When agriculture was more regionally stable, this rigidity of use was not serious, but in the last decade there have been universal changes in agricultural conditions.

Some of the factors which are demanding greater flexibility in farm plans are: new markets because of transportation developments; crop surpluses; government intervention in introducing control programs; and changes in demand because of style variations. A comparison of census statistics shows that the value of farm buildings in the South per farm is many times below that of midwestern states. This gives an idea of the magnitude of the farm structures problem facing the South, if a diversified agricultural program is to be instituted.

The general consensus of opinion seems to be that a plan of this type is essential to the progress and economic success of the southern farmer. But the question which arises is whether farm structures can be created with more "universality of design so that a building could be shifted in use". The three major functions of any farm building are: storage, air conditioning, and provision of efficient working conditions. To combine all three may increase the cost of construction, and the design may be such that adaptation to other uses may be difficult.

The first step in studying a farm building should be the determination of its economic relationships; second, should be determination of service requirements. Climatic variations may

require some transition from accepted design, and the character of the market may influence certain construction details. To combine these essential characteristics of buildings may well require the service of a structural engineer. This, then, is what agriculture needs—men who are considered authorities, conducting convincing experiments whose results will be accepted as satisfactory. In this way only will the building program be solved.

Thus it seems that the integral part of all farm enterprises, the nucleus about which farm activity is centered, the headquarters, "base of operations"—farm structures—has an unsettled future. What will the farm buildings of 1950 resemble—complex outlays with permanent rigidity of design, or simple structures with economy their keynote. Simple or complex, farm building design still remains the question mark of agriculture.

THE AGRARIAN

### CLEMSON ROYAL KNIGHT

continued from page thirteen

January 28, 1920 and is still in service in the herd of Senator C. S. McColl of Bennettsville, South Carolina. He is thought to be the oldest active bull in the history of the Guernsey breed to be used as a breeder. Appin's Blossom was sired by Upland's General 79094. He has thirty-four daughters with an official record of 9,397 pounds of milk and 500 pounds of fat as an actual production average.

Appin's Blossom has two official Advanced Register records. She produced 11,361 pounds of milk and 532 pounds of fat with her first calf. When she was five years old she produced 14,449 pounds of milk and 668 pounds of fat. In 1939, her herd record made at Clemson shows that she produced 15,761 pounds of milk and 708 pounds of fat. She was ten years and one month of age at the beginning of this unofficial record. One of her daughters, Cavalier's General Springtime 422446, a very fine individual, has just completed a record of 8,494 pounds of milk and 432 pounds of fat.

From the above information it can be very readily noticed that scientific breeding and mating brought about the production of Clemson Royal Knight. The combined production records of Saugerities Royal Sequel and Appin's Blossom give Clemson Royal Knight a prospect of becoming a great transmitting sire.

## THE FARMER OWNS THE PROPERTY

continued from page nine

unfortunate part of this whole rotten business is that those most able to bear the brunt of these mistakes and these evidences of planless operation are the ones least likely to pay."

We find in our society one group of individuals (farmers) totally dependent upon property for a means of living actually paying taxes in excess of net incomes, and also another group with five times the income of the farmers paying relatively less than one-fifth the amount of tax.

Since visible property is still the basis for most of the taxes levied in South Carolina and visible property is about all that most possess, it can easily be seen then that the present tax systems rest heavily upon the farmer whose "ability to pay" is in no sense comparable with the assessed value of his possessions. The farmer is unlike the business man of the city who owns intangible property such as stocks, bonds, etc., which can easily be, in many cases is, kept off the tax books.

It can safely and without question be stated that high property tax has been one cause of soil depletion, soil erosion, and many farm homes mortgaged. This is true because farmers plant cash crops which are usually soil depleting, cut over their timber land which causes soil erosion, for the purpose of raising money to pay taxes.

The property tax is based on value and not income derived from property. Therefore the tax does not fluctuate and the farmer pays just as high property tax during depression years as he does during years of prosperity.

— THE AGRARIAN —

## AN APPRAISAL OF FARM TENANCY IN SOUTH CAROLINA

continued from page eleven

tion of all our people. It is probably true that the tenant families of the state are falling short by one-third in producing their living on the farm. It is perhaps not too much to say that the greatest problem facing South Carolina today is to get the farm tenant families to grow their living on the farms they operate. If they could be stimulated to produce all the milk and butter, chickens and eggs, vegetables and fruits needed for home consumption, it would indeed mark a great and glorious day for South Carolina.

The Triple A is stimulating diversification among its co-operators by the use of benefit payments for production for home consumption. The Clemson Extension Service has continuously stressed the necessity of raising the living from the soil. The Farm Security Administration is making efforts along this line, including the lending of money to tenants to purchase farms, the provision of some supervision in farm management, and experimentation in tenancy leasing arrangements.

With thirty-seven of the state's forty-six counties having more than half, and with thirty-three having more than two-thirds of the farms operated by tenants, it would seem that these developments are quite appropriate and timely. Anything that can be done to encourage and develop greater stability among the tenant farmers should be done. Anything that can be done to get these farm families to produce their living from the soil should be done. But all this will take time. It is not possible to accomplish so much in a hurry.

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# The Use of Phosphate Fertilizers

By JESSE M. BAKER, '40

EVER SINCE the beginning, man has had a major problem in finding a means of existence. At first he got his food by hunting and fishing, but as populations increased and civilizations advanced, it became increasingly necessary for him to turn to the soil for a source of food. At first he knew very little about farming, but man soon found by repeated experiment and observation that certain practices would result in increased crop yields. Records show that as early as 500 B.C. the Celts had learned of the fertilizing value of marl, and by 200 B.C. the Greeks had learned that an increase in crop yields would result if Broadbeans were turned under the soil. Time marched on and man continued to learn more about Agriculture. In 1840 Justus von Liebig discovered that the fertilizing value of bones could be increased by treating them with sulphuric acid, so this can be thought of as the birth of the chemical fertilizer industry, although it was left for Sir John Lawes to definitely establish it on a commercial basis. The growth of the fertilizer industry has been tremendous ever since its beginning. Statistics show that the annual consumption of fertilizer by this country has increased from 80,000 tons in 1856 to 8,000,000 tons in 1937. From this it can be seen that fertilizer plays a leading role in agricultural production today, so it is now becoming increasingly important that everyone connected with agriculture have some knowledge of the common fertilizing elements and the role played by each in plant nutrition.

It has often been noted that low crop production is associated with low phosphorus content in the soil. This element is essential in both animal and plant nutrition, since it is found in every cell. The highest concentration of phosphorus in plants is found in the seed, and in animals it is found in the bones which make up the skeletal structure of the animal body. Animals raised in a section in which there is a general deficiency of soil phosphorus, often develop a disease known as rickets due to the fact that the plants grown on these soils do not contain enough phosphorus to adequately build the skeletal structure of these animals. It is, therefore, essential that the element phosphorus be given a great deal of consideration in any fertilizing program.



TOP—Rye receiving no phosphorus and potash  
BOTTOM—Rye receiving complete fertilizer

In general, the phosphorus content of all of our soil is low as compared to the amounts contained of the other common soil constituents. The total content of phosphorus in the soil is often not more than one-half that of nitrogen present and one-twentieth that of potassium. An equally important fact in this connection is that the majority of the soil phosphorus is unavailable for plant use because it is tied up with such insoluble substances as iron and aluminum. From this it can be gathered that the most fertile soils will soon show a decline in production because of a deficiency of phosphorus unless this supply is kept at a constant level by following good farming practices and by adding suitable fertilizing materials which contain this element.

A very common cause of phosphorus deficiency is the raising of animals or grain, and shipping them away. In either of these systems

of farming, the products sold contain large quantities of phosphorus. The cereal grains contain seventy-five percent of the phosphorus of the plant in their seed, so when these seed are marketed, large amounts of phosphorus are removed from the soil. Similarly, in a livestock farming program, thirty percent of the phosphorus content of the feed is absorbed by the animal, and then twenty percent of the phosphorus content of the manure is lost, so this leaves only fifty percent of the original amount to be returned to the soil, and often this is not returned. Another factor which contributes to the rapid exhaustion of soil phosphorus is erosion. Experimental results have shown that when corn was grown on a three and seven-tenth percent slope, more phosphorus per acre was lost by erosion in one year than is found in a seventy-five bushel crop of corn. It was also found that when a good rotation was practiced, the loss of phosphorus per acre by erosion was as much as is found in a twenty-five bushel crop of corn. Lipman and Conybeare recently made studies of this problem, and they have estimated that the annual loss of phosphorus in this country by erosion is over two million tons, which is approximately equal to the amounts removed by harvested crops and by grazing combined. This data shows that the majority of phosphorus losses in the soil are caused by erosion and by cropping. It would be unwise to try to reduce the amount of phosphorus needed for plant growth because that would lower production considerably. The main problem in conserving the phosphorus supply then is to control erosion and to return all animal manures and plant residues to the soil.

Experimental evidence shows that most soils respond vigorously to applications of phosphate fertilizers. Of course different soils give different responses to phosphate fertilizers, but in general, acid clay soils, low in organic matter give the greatest responses to this fertilizing material. Often times, though, the degree of phosphorus deficiency is determined not by the soil type but by the treatment which the soil has received since it was brought under cultivation.

Phosphoric acid plays a definite role in plant nutrition. This element appears to be concerned in the production of the nucleo-proteids, and it also influences the production of seed or grain to a marked extent. Phosphoric acid tends to hasten the maturity of some crops, and often times farmers add this compound to the soil for

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# JES' REXALIN'---TO D. C. R.

By T. E. GOODSON, '40

Git up niggah, what ails you?  
Ain't cha got no wuk ta do?  
You ain sick, is ya man?  
Ain't cha got ta plow dis lan'?

De Cap'n's gwine to fix you sho,  
Ah ain lyin', you done know  
De boss done say he want no slack,  
An' he meant businez, das a fac'.

Ha'd haid niggah, das sho you,  
Stubb'n a mule an' tree stump too.  
Git up off dem lazy bones,  
An' lawdy hush dem triflin' moans.

Why you tak' so long to rise?  
Lie dere den, an' roll dem eyes.  
Ah done gone an' had my say,  
An' ah'm de one'll git de pay.

Y'all ain risin', is ya now?  
Ah 'bout thought you ain knowed how.  
Uh my lawd, doan lie back down.  
Dat must be some real soft groun'.

Yeh, hit is rite nice at dat,  
Put you haid rite on ya hat.  
Sho is nice, jus feel dat breeze,  
An' listen to dem big pine trees.

Ah spec' ah'll kinda res' mahse'f,  
Long anuf to git mah bre'f.  
Sho feel good ta lie dis way,  
Ah could almos' spen' de day.

Ah heared ya, niggah, ah ain deaf,  
But ah ain quite yet got mah bre'f.  
Go on man an' let me be,  
I'se relaxin', can't cha see?

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## LIVESTOCK vs. THE ONE-CROP SYSTEM

continued from page five

income derived from these two crops isn't spread out over the whole year, it usually is sold soon after harvest. This large sum (it's usually very small after the fertilizer bill has been paid, the merchant also must be paid for his services during the growing season) is no incentive to save and a rickety old car is the fruit of six or eight months of back-breaking toil. When the labor problem is considered, livestock furnishes a year-around job. Cotton and tobacco and grass that grows therein waits for no man. All of this comes during a comparatively short time and there can be no waiting.

Compared with other nations we are but an infant. Yet already willful waste, neglect and soil erosion have taken an enormous and disgraceful toll. We have periodic floods. In our far western states dust storms have left too many farms a total loss and the farmer living on them nothing to look forward to but tenancy. In our own state we have farms, many of them that have been abandoned not only because they were unprofitable which in itself is a rather common occurrence in South Carolina, but because we could raise absolutely nothing on them. **How can someone produce crops on a farm that is somewhere out in the Atlantic?**

As expressed by the United States Department of Agriculture, "Thirty-five million acres of cultivated land have been essentially destroyed in this country by man induced erosion." This is an area as large as Pennsylvania, Connecticut, and Massachusetts combined. But the total loss of this land represents but a part of the problem. Of the 35,000,000 acres now under cultivation, about 125,000,000 have lost all or most of the productive surface soil by sheet erosion. Another 100,000,000 acres is being washed away so that in time a subsoil will be exposed that is ten times less productive than the soil which is yet available today. Faster than any peoples of the world, we have been permitting the depletion of our agriculture land".

When soil erosion control is practiced fertility is conserved. When crops are "hogged off" or grazed, less plant food is removed from the land, and when manure is returned to the soil, materials are added that might otherwise have to be purchased in the form of commercial fertilizer. It is certain that livestock production will aid in soil conservation simply because the amount of organic matter returned to the soil will

be greater, and many of our worn-out fields will be planted in permanent pastures. South Carolina farmers let us rid our state of a system that is destroying our basic heritage, the soil. Let's unite for a more prosperous state. Let's rally around the "Banner of The Hog, Cow, and Hen", and watch us go places."

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## THE CIVIL AND POLITICAL STATUS OF THE SOUTHERN NEGRO

continued from page seven

the leader of the freed slaves, and exploit their ignorance.

In spite of all the corruption and vice of the Carpetbaggers and Scalawags immediately following the war, it seemed that everything was set for a peaceful return of the states to the Union, when radical agitation was begun by a group which was bent on punishing the South and subjecting the southern whites to the rule of the Negro. This group was determined to disfranchise the whites of the South and to enfranchise the Negro. In furtherance of the views of this group, whose aversion to and lack of sympathy for the South had grown with the months, the southern states had made one fatal blunder—they had passed the "Black Laws". The unrest in the South due to idle and wandering Negroes was a sore trial, and something had to be done to govern them—so the "Black Laws" were passed. Why the southern leaders did this can be easily understood, but it can be just as easily seen that they greatly harmed their own cause, and completely tied the hands of the President (who wanted to avoid the "reconstruction" treatment of the South). The "Black Laws" gave the unitive-minded faction the perfect argument for the application of its policy.

### "Reconstruction"—

#### Greatest Evil Ever Imposed on Our Nation

No greater calamity than this could have befallen our people. It swept the northern men into bitter persecution of the South; it united the southern whites in a stubborn opposition and created in their minds a bitter feeling towards the blacks; and it put into the minds of the ignorant freedmen false hopes which they were not then capable of realizing. The North felt that the South was trying to virtually enslave the Negro again, and the South felt that the North was trying to put an ignorant class in charge of them. The policy of Congress was worked out to make the voting South as black as possible, and to exclude the leading whites, as far as possible, from the vote.

But, as R. S. Baker said, "Mankind is reconstructed not by proclamations or legislation or military occupation, but by time, growth, education, religion, thought." So, as a result of this reconstruction policy, there was a revolt on the part of the white leaders, who possessed most of the intellectual ability in the South, and by pass-

age of the famous "Grandfather Clauses" and through other political maneuvering, they wrested the ballot from the Negro.

Since this period of reconstruction (which has not entirely ended yet) the South has remained as solidly unipartisan as it was before the war. The planters, before the war, decided that it was for their best economic interest to act as a unit, and this was the beginning of the "solid South". Since the end of the war the dominant political group has felt that all white men must stand together or be dominated by the Negro. Most politicians have honestly believed this, but others have used this fear of Negro domination as a horse upon which to ride into office. The effects of this concern regarding Negro domination are readily detected, even today, in our civic and political policies. The southern white legislators have been constantly concerned about maintaining white supremacy; the colored man has continuously been striving to come into his own, politically. The Negro was excluded from the Democratic primary, which is virtually the same as election in most southern states. Therefore, the few Negroes who have been allowed to register have been solidly Republican, and it follows, naturally, that the whites would be solidly Democratic in order to maintain supremacy (in event of Negro suffrage becoming of sufficient proportions to be considered a serious threat). This political situation in the South has been of inestimable harm to the white southerner as well as to the Negro.

As long as the South is forced to vote "solid", no political justice can be secured, nor can statesman-like policies be initiated for the good of the region. For years the latent, but ever-present potentialities of the Negro have had an important influence on the thought and legislation of the southern people and politicians. There has been no independent thinking because this would mean division, and division, it has been believed, would lead directly to Negro domination.

#### South Must Become Bi-Partisan To Attain Position of Power

The hope of the South politically, economically, and socially is that its people shall throw off this delusion—that they shall set up high standards of civic and political participation, which will be administered with plain justice to persons seeking franchisement and which will eliminate ALL unfit persons. There are more than two white persons to every Negro in the

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# *A Social and Economic Summary of the South*

By E. P. HUGUENIN, '42

FOLLOWING President Roosevelt's assertion that the South is the nation's "number one economic problem," economists are now turning their attention toward the domain of King Cotton, previously made immortal by song writers, dramatists, and raconteurs of dialect jokes.

"The South comprises just over 28% of the area of the United States and just under 28% of its population," says a bulletin from the Washington, D. C. headquarters of the National Geographic Society. It is in the same latitude as Tunisia, Algeria, and Morocco and it is warmed by the same blazing sun which scorches them.

With little more than one-fourth the country's land, the South produces 93% of the nation's cotton, 90% of the tobacco, 99% of the peanuts, 80% of the rice, 95% of the grapefruit, and 100% of the sugar cane.

## **Have Much in Common**

Much the same problems prevail throughout the five states on the Atlantic Coast south of the Potomac, the four states on the east side of the Mississippi and South of the Ohio, and the four states west of the Mississippi and tied to it through the Arkansas and Red River Valleys. These states have in common a larger proportion of rural population and negroes than the rest of the nation. In the United States, taken as a whole, 56% of the people live in towns and cities; in the South only 33% are urban dwellers with the other two-thirds still on the farm. One half of the farms of the nation are in the thirteen states of Dixie. The average Southern farm today is 196 acres. Farmers in the rest of the nation have a little over that average (averaging 205 acres each). This difference is due partly to more intensive cultivation on the part of the Southern farmers with more extensive use of fertilizers on the soil depleting crops.

The Cotton Belt is one of the most thoroughly "one crop" areas in the world. Here about 3% of the world's soil produces 60% of the world's cotton. Half the farms of the South have as their main crop, cotton; and where cotton is king nothing is allowed to challenge its supremacy. In many cases there isn't a thought given to a garden plot in which to grow vegetables. In a way, the philosophy of many South-

ern farmers is that of the Mexican—a drawled, "Manana" issued from a seat under a cool shade tree. As a result, the occupants of the typical cabin in the cotton belt frequently have to buy vegetables, fruit, milk, and eggs, or develop pellagra for the lack of them. The dominance of cotton, and other factors results in very low incomes for the South. In 1929 the average Southerner received only \$383.00 for the year. The farmers had a much lower average income with the minimum in South Carolina a pitiful \$129.00. Inhabitants of Delaware and New York had an average income of about \$1,300.00 per capita during the same period. Even with so much of the nation's earthly wealth, the South harvests only 16% of the dollars to be divided among 28% of the people. The per capita wealth is a trifle less than 60% of the United States' average.

The area has an interesting variety of cultures, including the Colonial dignity of Charleston and the low country, the French and Spanish glamour of New Orleans, the conquistador legends of Florida, Kentucky's far-famed bluegrass and Colonels, and the moss-hung bayous of Louisiana and Mississippi. Other contributions to American folk-lore are the haunting negro spirituals, the blue jazz music, and the rollicking hillbilly ditties which are Southern born and bred.

## **A Homogeneous Population**

The South has been frequently called the most "American" section of the nation because it has the highest proportion of native population—largely of English ancestry along the coast, with the Scots in the highlands. In Florida and Texas alone does the foreign-born population exceed 2%. In Massachusetts 28% are foreign-born. Even with this, the Southern States have the lowest ratio of native white inhabitants in the United States, because of their nine million negroes, three-fourths of those in the entire country. A little over one half of Mississippi's population is negroid and slightly less than half of South Carolina's. The rest of the states have at least one negro out of every four inhabitants, with the exception of Texas, Tennessee, Kentucky, and Oklahoma. The last two mentioned have fewer than the average for the nation.



### Varied Sources of Wealth

Though Agriculture is the South's biggest business, it has enormous potential wealth besides the 60 odd crops of field and orchard. From fast growing forests that have yet to be cut-over can come turpentine, pulp wood and yellow pine timber, along with various other equally valuable woods. The coast of the Southern States, which makes up half of the nation's coast line, is teeming with fish, sponges, shrimp, crabs, and oysters. Texas and Oklahoma have a substantial lead in the production of petroleum, and then with Arkansas and Louisiana, they account for approximately two-thirds of the total output of the United States. Texas has virtually a world monopoly on helium gas, and sulfur. Arkansas is the United State's foremost source of aluminum, and Oklahoma of zinc.

In Texas the manufactured products have begun to exceed the farm products, and the Southern trend toward industry grows more pronounced yearly. Cotton mills in the South operate three times as many spindles as New England factories. The South has very few tobacco factories, but what they lack in number they make up in size and the region turns out over 80 percent of the cigars and cigarettes.

It is now agreed that the South has yet to realize her great possibilities in many fields. The Dairy industry, for instance, is one that so far has received but scant attention in South Carolina, which doesn't produce nearly enough milk for its own inhabitants. The lumber industry is also in its infancy. We still import far too many eggs that could be produced in our own back yards for home consumption or as a business in itself. As the south wakes up and comes into her own, she will surprise her sister states and the rest of the world with her self-sufficiency, which is the ultimate aim of any social group.

— THE AGRARIAN —

### THE CIVIL AND POLITICAL STATUS OF THE SOUTHERN NEGRO

continued from page twenty-six

South. If those members of society who fall below the standard set because of ignorance, crime, or other factors, are eliminated, there is no reason to believe that the Negro would dominate in any section, and such a procedure would open the way for a progressive South; it would stimulate, once more, civil and political leadership among the whites; and it would set an incentive for educational and property progress before the Negro people of the South. Gradually, this

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would make for more independent thinking and directed inquiry in selection of political party. Some such step seems necessary if the South is to take a place of leadership in the affairs of the nation.

## SOUTH CAROLINA EXPERIMENT STATION

continued from page three

Magnesia." In 1859 Thomas Green Clemson was placed in charge of the Bureau of Agriculture with the title of "Superintendent of Agricultural Affairs", and in this capacity he was very influential in bringing about the passage of the "Morrill Act" and the "Organic Act" of 1862, which provided for the establishment of the Land Grant Colleges and the Department of Agriculture, respectively. A few years later, 1887, the "Hatch Act", which provided for the establishment of State Experiment Stations, was passed by the National Congress, and from this Act arose the present system of experiment stations in the United States.

The size at first of the South Carolina Experiment Station was very small. The spring of 1891 found the station with only a four acre garden under cultivation, and at the end of this year the station had only ten acres of land cleared and a fifty or sixty acre pasture, but even with this small amount of land, experiments were carried on. Some of the problems that were worked on in this first year were: "What is the earliest, hardiest, and most prolific wheat for this section; what is the relative yield of Red Rust Proof Oats from seed grown in Texas, and in South Carolina, and from seed grown on fields of different fertility; and in what proportion and amounts do cottonseed meal, dissolved bone, and nitrate of soda give greatest profits?" It can be seen that problems of this sort were very important to the farmer of that day, and they are more important to us today because of the fact that our land is gradually decreasing in fertility with a resultant reduction in crop yields. If research work was not continuously carried on in agriculture, our levels of crop production would soon fall to a point where our land would not yield even a moderate income, so this is the place where the experiment stations of the country play a big part. They are continuously working for the betterment of agriculture, and many times they save the farmer money when he doesn't fully realize it, and they could save him even more if he would come to them with his problems. There is a local Experiment Station, in practically every section of South Carolina, and they are always ready and willing to help the farmer solve his local problems. Visit your local Experiment Station, and tell them your problems—it will pay you big dividends.

## TO A HILL

By T. E. GOODSON, '40

I feel the most exotic thrill  
When I have climbed a country hill  
To find what treasures lie beyond,  
A rug of trees, or silver pond.

I rule that world below my throne,  
Each leaf, each twig I call my own.  
My realm includes a field of weed,  
And meadows where the cattle feed.

The forest hums and sways for me,  
The brooks are filled with gossip glee.  
The wind delights to feel my face,  
To muss my hair, and onward race.

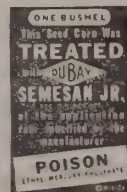
My vaulted ceiling, painted blue,  
Rechanges clouds, and then its hue,  
For evening colors rich and bright  
In glory herald coming night.

The shadows stretch and start to play,  
To join hands, and gently sway.  
And I upon the earth's high breast  
Have suckled joy, then peace and rest.

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## THE USE OF PHOSPHATE FERTILIZERS

continued from page twenty-three

the purpose of getting unusually early crops for marketing purposes. It has been found that phosphoric acid also has an influence on cell division, and in its absence starch will not change to sugar. This element also stimulates the development of root systems. A dark green color of the leaves of most field crops is generally a sign of phosphorus deficiency.

There are several ways by which the ever-decreasing supply of phosphorus in the soil can be replenished. A very old and also a very practical way is to turn all animal manures and plant residues directly into the soil. In the majority of cases the amount of phosphorus added in this way will not be sufficient to keep the supply in the soil at a constant level, so it then becomes necessary to add some commercial phosphate fertilizer as a supplement. There are many fertilizing materials which are commonly found on the market that carry phosphorus, but probably the most common one is superphosphate. This is a product resulting from the treatment of phosphate rock with acids. Sulphuric acid is the one most commonly used in this process since it is relatively cheap but some phosphoric acid is used. The reason the phosphate rock is treated with acids is to make the phosphorus more available for plant use. In much of this phosphate rock is found the element flourine which ties the phosphorus into an unavailable compound, and when acid is applied to this material the flourine is removed, thus making the phosphorus more available for plant use. The next most common phosphorus-carrying fertilizer found on the American market is basic slag, a by-product of the steel industry. When this material is ground fine enough that eighty percent will pass through a ten thousand-mesh sieve, good results are often obtained. The South Carolina Experiment Station recommends from four hundred to fifteen hundred pounds per acre.

As our soils are gradually decreasing in fertility each year, and as their present status of fertility is comparatively low, in the future it will be imperative that we follow good soil management practices in order to insure our economic security from the farming industry. May we ever strive toward this goal which will ultimately put our levels of crop production on a higher plain and will leave to our posterity a greater and better agriculture.

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**MILITARY EQUIPMENT**

## More Elements for Better Livestock

By W. S. GAILLARD, '40

IN OUR VOCATION of agriculture we are confronted with a vital relationship, that of the soil, plants, and animals. In the production of livestock we have to start with the basic factor which is the soil. It determines to a great extent, the analysis of plants (in minerals and nutrients). The growth and well-being of our animals, in turn, is affected by the minerals and nutrients received from the plants.

The economical production of livestock depends greatly on the production and utilization of cheap feeds containing essential elements and a high percentage of digestible nutrients. From experimental work we find that economical growth of plants cannot be made when certain elements are deficient. This is where we find the relationship of the soil, plants, and animals playing an important part. When animals are fed plants and grains grown on soils which are deficient in one or more elements, the deficiency shows up in the animal unless a supply of the deficient elements are furnished in a mineral mixture.

Why "beat around the bush?" We feed a mineral mixture to animals to take the place of elements which are deficient in feeds grown on certain soils. When a mineral mixture is fed, it corrects the deficiency in the animal, but the condition is unchanged in the soil, and in plants grown on the soil. The plants cannot make efficient growth on deficient soil, and the farmer is still in the "hole", for after all the purpose of livestock is to market home grown feeds. If the cost of producing feeds is high, the profit from the livestock will be small; therefore, feeds must be produced economically.

Sooner or later we are going to be forced to get to the root of this mineral deficiency trouble and it all goes back to the soil. The essential elements, if not present in the soil, must be put there so the deficiency in the plants can be arrested. By doing so, the deficiency in the animals will be automatically corrected. After this condition is met, the cost of producing feeds will be less, since the essential elements are present (thereby ending the need for a mineral supplement), and the profit from the livestock will be greater.

After all we have a hold back. The elements will be absorbed by the plant when applied to the soil, the deficiency will disappear in

the animal eating plants from the treated soil—provided the deficient elements are applied in the correct quantities. When applied in large quantities many elements become toxic to the soil, to plants, and to animals eating these plants.

In the future we may see a day when the farmer can have a test made of his soil from which chemists will be able to make recommendations as to what elements are needed in his soil and in what quantities. Not a recommendation from any one standpoint, but a recommendation taking into consideration the relation of the soil, plants, and animals as related to the essential elements. Certainly this appears to be the most practical way of correcting deficiencies of such elements as copper, iron, calcium, potassium, and many others.

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# The Agrarian

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No. 3

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## A Successful Jersey Farm

By J. E. BLESSING, '41

The outstanding Jersey herd of South Carolina is that developed by the Wheeler Brothers at Saluda, as part of a program of diversified farming. Past experience convinced them that the Jersey would be the most economical breed for their farm. They selected the "Jersey Volunteer" family as the line to develop and line breeding as the method of development. In 1929 Mr. L. E. Wheeler went to the B. H. Bull and Sons farms, a noted Jersey Cattle establishment in Canada, and purchased nine females and one male of the "Jersey Volunteer" family. This purchase was the foundation of the herd which has been recognized as the best show and production herds in the state.

A daughter of Souvenir Beauty's Design, one of the first females in the herd was selected as a representative of the Jersey Breed at the Borden Exhibit "Dairy World of Tomorrow" at the New York World Fair. Five bulls of this herd have been awarded The American Jersey Cattle Club Silver Medal rating. Volunteer Roseboy's Design 347772, which was one of the five to qualify, is now owned by Clemson College. A selected group of daughters from the five bulls have been retained in the herd for breeding

farm operations while Mr. L. E. Wheeler has direct supervision of the herd. Mr. J. J. Wheeler does all the bookkeeping for the firm and assists his brothers in their work. The farm and milk stock. The herd is now headed by the following herd sires: Brampton Naidni Forward 391544, a great grandson of Jersey Volunteer; Brampton Stan Favorite 391551, also a great grandson of Jersey Volunteer; Bet's Volunteer Observer 384-553, a four star bull with twenty-six earned credits; Afterglow's Estella Signal 396491, a four star bull and the grandson of Imported Observer. The Wheeler brothers, known as "The Bull Provers", have used the above foundation to breed the animals which they have sold in almost every state in the U. S. and exported to South America.

The owners have found it economical to produce all of their feed on the farm and to maintain permanent pastures for the herd. They are growing grain and roughage which is best adapted to their section of the state and, therefore, are getting economical returns.

The dairy and farm are operated as two separate units with brothers at the head of each enterprise. Mr. J. C. Wheeler is head of the

continued on page twenty-one



# *Lubrication of Diesel Engines*

By A. F. BURGESS, '41

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*As important as the work they do, the engines must be serviced, skillfully, frequently and correctly.*

---

As we find ourselves in the midst of the machine age, it is only natural that we consider the machine that is often spoken of as the baby of the power units—the Diesel. The Diesel is rapidly becoming more adapted to a wider range of conditions, and are now being found on comparatively small farms which was once looked on as almost impossible. The Diesel has satisfactorily proven its merits in use as a stationary power unit. On relatively steep farming land as is found in the Piedmont section of S. C. and other similar valuable farming areas, the Diesel has been found to work very satisfactorily even after general purpose tractors seemed impractical. Diesels are definitely here to stay, and it is only natural that we should carefully consider the care and operation of this power unit. Since the success of operation and life of the engine is at its end without this knowledge.

Satisfactory lubrication of an internal-combustion engine, has developed into one of the most complex unsolved problems for the modern engine builder. This is largely due to the rapid advances made in engineering and design in the last few years which have resulted in greater pressures, higher speed, and higher outputs of engines. This is particularly true in the case of aircraft and high speed Diesel engines.

The rapid development of the high-speed Diesel and its acceptance as a dependable and economical source of power brought about the realization that the demands placed upon ordinary lubricants by this type of engine were far beyond their limits of stability, oiliness, and film strength.

The arrival of efficient high-speed Diesel engines with their higher pressures and more critical piston-ring hilt temperatures resulted in frequent failure of the engine due to piston ring sticking. Much time has been spent in an effort to find a solution to this problem.

The first step along these lines was the further treatment of lubricants to achieve a state of higher chemical stability. Cooperative research

by the engine builders and the lubricant manufacturers disclosed the fact that overtreatment of lubricating oils was not only possible but also as injurious to the lubricating qualities. Extensive tests were made, and certain stocks were selected as representing the optimum in balance between purification and the retentions of all desirable lubricating qualities. But these fell far short of providing satisfactory lubrication. It was at this point that additive agents were introduced to increase film strength, oiliness, and resistance to oxidation. These compounds, when added to basic stocks of proper origin and treatment proved of inestimable value in the lubrication of high-speed Diesel engines.

All lubricating oils contain, in varying percentages, natural oxidation inhibitors, and film strength compounds. The additive agents used in the manufacture of special Diesel lubricants are added, not to give an oil new qualities, but to increase the effectiveness of those already inherent in the lubricant.

Another very important problem has been that of bearing lubrication. Bearing failures are caused in most cases by excessive temperature. Pressure with respect to bearing failure are only of secondary importance.

There are many causes for the development of excessive temperature in connecting rod and main bearings. One common cause often overlooked is that of the introduction of foreign material, as silica, small wear particles, or metal filings, into the lubricating system. This material is carried by the oil stream to the bearings and gradually becomes imbedded in the bearing metal, changing a precisely manufactured bearing into an excellent lapping tool. It has been found that this type of contamination causes wear rates as high as 0.001 in. per 100 hours of operation. A shaft worn to an out-of-round condition touches the bearing unevenly, causing local

continued on page twenty-two



# Organic Matter And Our Soils

By J. M. BAKER, '40

---

*As soil productivity is dependent on organic matter, careful conservation and thrifty management are essential to provide an abundant supply.*

---

As the original source of all organic matter is plant and animal tissue, the history of this organic residue dates back to the first plant and animal decay on the surface of the earth. Ever since nature began to break down parent rock into soil by chemical and mechanical processes, plants have grown, died, been decomposed and been more or less mixed with this mineral aggregate from time to time. In the beginning, nature provided a biological process to keep this organic matter from accumulating on the surface of the soil in an unchanged condition, and today this process to keep this organic matter from accumulating on the surface of the soil in an unchanged condition, and today this process is of considerable economic importance to us as it causes these complex organic compounds of the soil to be broken down to simple end products which are available for plant use. In this breaking down process, the organic matter is reduced to complex compounds such as humus and to simple end products such as nitrates, and because of this fact our soils can be enriched considerably by the incorporation of suitable organic amendments.

Organic matter influences the productivity of soils in several ways. The physical properties

of very sandy soils or of heavy clay soils are greatly improved by the incorporation of suitable organic amendments. In a clay soil porosity is increased and plasticity is reduced, whereas in a loose sandy soil the organic matter has a binding effect and retards excessive percolation. Recent experiment has also shown that organic matter in the soil tends to minimize soil erosion, so in the future it is very probable that this material will play a leading role in all conservation programs. Humus, one of the end products of organic decay, is very colloidal in nature and because of this fact, when it is incorporated in the soil to any appreciable extent, the water holding capacity of the soil is increased. Humus also plays a big part in the process of base exchange in the soil. Potassium, one of the essential plant elements, is held in the soil by this colloidal complex and not by chemical combination, so this element can be preserved to a considerable degree if there is a plentiful supply of organic matter present in the soil.

There are several ways by which a person may add organic matter to the soil. Farm manures have always been of great importance as

continued on page twenty

\*Reproduced from 50th Annual Report, courtesy of the South Carolina Experiment Station



Showing height of plant where cotton has grown 11 years without addition of organic matter



Showing height of cotton plant where eight tons of manure and a cover crop of rye and vetch have been turned under for 11 years



# *Problems in Plant, Animal and Human Nutrition as Related to the Social and Economic Life of the South*

## GUEST EDITORIAL

By DR. H. P. COOPER

### **PRESIDENT'S ADDRESS (Association of Southern Agricultural Workers, 1939)**

The theme of our meeting is very appropriate at this time of readjustment in Southern agriculture. Cotton, the great money crop of the South and the one upon which its economy is based, is losing its relative position in world trade. The agriculture of the old South has undergone many changes and readjustments in the past. The early settlers began in a wilderness and had to face the possibilities of adjusting themselves to the material at hand for the sum total of their consumption. The fortunate production of a surplus of such crops as tobacco, rice and indigo in various sections prevented the rapid lowering of standards and made it possible for the settlers to trade with the old world and secure some of the products of a more complex social system such as existed in Europe. This system depending primarily upon one single or a limited number of cash crops such as tobacco or rice or indigo led to the exploitation of our soil resources. Such a system of necessity ran its course in the old region of the South well before the American Revolution.

At the present time it is generally realized that the South can no longer depend solely upon cotton as the foundation on which to build a strong and permanent civilization. It is evident that the existing economy of the South will soon be forced into a reorganization that will call for many painful readjustments. The one crop system has accounted for the exploitation, depletion and abandonment of a large amount of soil. It is imperative that these abuses of land be remedied if we hope to build a profitable and permanent system of agriculture.

It is generally recognized that fertile soil, a long growing season and abundant rainfall are necessary in the production of a desirable rural civilization. The Southeastern States are particularly favored in that they have a long growing season and an abundance of rainfall. In addition to a favorable climate, the soils in this region are capable under proper management of producing many crops and of supporting a diversified system of agriculture. The South also has mineral wealth, transportation facilities and man-power, all of which are necessary for the economic and social welfare of the region. In spite of its many natural resources, the South remains one of the poorest regions of the country. This may be partially attributed to a lack of appreciation of the potentialities of our natural resources. We have been accused of wasting our land, men, money, time, and opportunity. It is estimated that more than three and one-half million people have emigrated from the South to other regions in search of wider opportunities were a large number of the most capable and resourceful citizens. This represents a substantial loss to the South. During this period also the South has depleted and abandoned approximately one hundred million acres of land.

It has been pointed out by Odum that there are five major bases of a great civilization—two primary and three secondary. The South has the two primary bases, natural wealth and human wealth, but it is lacking in the three secondary bases, namely; technological skill, artificial wealth, and institutional services. Southern deficiencies are all in those things which may be supplied by intelligent efforts. Artificial wealth which makes it possible to

maintain institutional services is largely created by intelligent effort. Without intelligent direction tremendous efforts and sacrifices may be made and little accomplished.

The South is beginning to consider critically its resources, deficiencies and possibilities. It is realized that we have been hampered by traditions which have impeded progress in many cases. The complicated problems cannot be solved without pursuing a reasonably logical and intelligent course. Leadership for such a course will have to come largely from the membership of this organization. It is our challenge and our responsibility to direct the agricultural development of the South.

Before attempting to reorganize agriculture on a large scale it is necessary to examine closely some of our major deficiencies.

The nutrition problems are basic biological factors in our complex social system. These problems begin with the soil and extend through every level of life up to human nutrition. The soil fertility conditions in the South have been an important factor in determining the types of agricultural systems followed. There has been too much emotion and not enough facts in the approach to many of our agricultural problems. While it is true that we have favorable climatic conditions and suitable soils for producing a wide variety of crops we sometimes lose sight of the fact that in a highly complex social system it is necessary to secure a profit from our enterprises if the individual is to maintain a desirable economic and social status.

The soil fertility problems are such that it is necessary to add relatively large amounts of commercial fertilizer per acre in the production of our staple crops. The growers of food and feed crops in the South must compete with those in regions with more productive soils. The bulk of the food and feed crops of the country are produced on the virgin fertility. The agriculture in the grain producing regions is still in what might be termed the exploitation stage whereas in the South it is necessary to add plant nutrients in quantities comparable with the amounts removed by the crops.

Our economic, political, social, and soil conditions have been such as to favor the establishment of specialized highly fertilizer cash cropping systems. This specialization has been carried much too far in that it has resulted in a system where many of the products needed on the farm have been purchased out of the proceeds of cash crops rather than being produced on the farm.

### **Fertilizer Consumption in the South**

The amount and the percentage of fertilizer consumption in the United States and in the seven Southeastern cotton states are shown in table 1. These states use approximately 56 per cent of the fertilizer used in the United States. They are expending for too large a proportion of their farm income for fertilizer and not enough for lime. The use of large amounts of acid forming nitrogenous fertilizer materials has increased the acidity of our soil, and has resulted in a marked reduction in yields of many crops. It has also led to low farm income and abandonment of large areas of once productive soils. The lack of sufficient vegetative cover has resulted in the loss of much of the virgin top soil by erosion.



### Deficiency of Minor Nutrients

In addition to the major nutrients, nitrogen, phosphorous and potassium, it is often necessary to add some of the minor mineral nutrients such as magnesium, manganese, zinc, iron, copper and boron to produce optimum growth of plants. The recent work by Garner and McMurtry of the U. S. Department of Agriculture on the effect of various nutrients on the growth of the tobacco plant has directed attention to the significance of minor mineral nutrients in the production of crops on some of our important soil series. The results secured from addition of minor nutrients to the soil by certain experiment stations including Maine, New Jersey, Virginia, North Carolina, South Carolina, and Florida indicate the widespread deficiency of certain of these mineral nutrients. These deficiencies are most commonly encountered on the gray sandy loam soils in the Coastal Plains or in soils relatively high in organic matter such as peat and muck soils.

The minor mineral nutrients can be added readily and cheaply where their need is demonstrated. However it is necessary to know the correct amounts to add as excessive amounts of certain of the mineral nutrients may be highly toxic to plants. This is one of our important problems requiring technical skill in arriving at a satisfactory practical procedure in supplying these deficiencies.

Table 1.—Fertilizer Consumption in Tons in Seven Southeastern Cotton States and United States, 1937

State	Tons	Percent of U.S.
North Carolina	1,236,564	15.16
Georgia	866,360	10.61
South Carolina	771,198	9.45
Alabama	629,260	7.71
Florida	579,399	7.10
Mississippi	325,320	3.99
Louisiana	157,318	1.93
Total	4,565,419	55.95
United States	8,158,392	100.00

### Soil Acidity Problem

Much of the soil in the row crop section of the Southeastern States has become entirely too acid for the successful production of a wide variety of crops necessary in a diversified system of agriculture.

The data in table 2 show the pH values and the acidity conditions in over two million soil samples from South Carolina farms. These data are very probably representative of the conditions encountered in the Piedmont and Coastal Plain sections of the Southeastern States. However these data would not apply to the delta region or to the alluvial soils along the large streams. It is noted that 41.38 per cent of the soil samples are classified as extremely to strongly acid whereas there were only 19.42 per cent classified as slightly acid or alkaline. These slightly acid and alkaline soils have a suitable reaction for the establishment of a diversified system of agriculture. But this is too small a proportion of our soil to affect materially the type of agriculture in this region. These data show that it is not possible to have a profitable diversified system of agriculture under such conditions. It is evident that we shall have to use large quantities of lime material if the soil acidity is reduced sufficiently for the production of many of our most nutritious food crops.

It is very gratifying to note that several of the Southern States, notably Kentucky, Virginia, and Tennessee, are leading the region in the addition of limestone for the correction of soil acidity which will make it possible to maintain a profitable diversified system of agriculture. These states which have some of the most productive soils of the South are the ones using the largest amount of

Table 2.—Summary of pH Values of South Carolina Soil Samples

Degree of acidity	Arbitrary pH value range	Soil samples		
		Number	Each class	Cumulative
Extremely acid	Below 4.51	33,395	1.55	-----
Very strongly acid	4.51-4.75	66,144	3.07	4.62
	4.76-5.00	144,354	6.70	11.32
Strongly acid	5.01-5.25	263,930	12.25	23.57
	5.26-5.50	383,723	17.81	41.38
Moderately acid	5.51-5.75	430,907	20.00	61.38
	5.76-6.00	413,455	19.19	80.57
Slightly acid	6.01-6.50	360,669	16.74	97.31
	6.51-7.00	48,046	2.23	99.54
Alkaline	Above 7.00	9,695	0.45	100.00
Total	-----	2,154,318	100.00	100.00

lime. This suggests the necessity of using much larger amounts of lime in some of the other Southern States.

Lime is recognized as one of the basic factors in the nutrition of both plants and animals. An adequate supply of calcium in the soil is necessary for the production of a variety of nutritious food crops which are essential for the proper nutrition of both farm animals and human beings. It is generally known that limestone soils are well adapted to the production of high quality livestock and well nourished people.

The poor quality of livestock on many southern farms is due to poor quality of feed produced on the farms. It will be necessary to correct the nutritional deficiencies in our soil before we can hope to produce the quality of feed crops necessary in the production of high grade livestock.

The low nutritional value of many of our crops and the deficiency of livestock products in the diet has resulted in a large proportion of our population being improperly nourished. Inadequate diet and ill health cause a great loss to the economic and social life of the South.

### Liming Program and Some Problems Encountered

It is interesting to compare the amounts of lime materials used in the Southeastern cotton states with the amounts used in other regions as shown in table 3. The Northern and Midwestern states have less acid soils and are using much more lime than the Southeastern cotton states.

During 1937 the equivalent of calcium oxide in pounds per acre of cropped land for certain states was approximately as follows: Kentucky 100; Pennsylvania, 67; Virginia, 60; Wisconsin, 50, and Tennessee, 45. The amounts for the cotton states ranged from approximately 19 pounds for North Carolina to less than one pound for Mississippi in the Southeastern cotton states. The Southern farmers are attempting to establish a more self-sufficient diversified system of agriculture without adding the necessary lime found by other regions to be absolutely necessary for the success of such a system. It is not likely that we shall succeed in establishing our agriculture on a broader base without following the basic practices found necessary by other regions.

A general liming program on many of the southern soils is not as simple as might first appear. The problem goes beyond the addition of lime material. Indiscriminate liming may lead to some very serious complications and result in lower production than before lime is applied. Lime may effect the availability of some of the minor mineral nutrients in the soil such as magnesium, manganese,

continued on page nineteen



# Federal Aid and Education

By G. A. STOUDEMIRE, '40

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*The problems of providing vocational training to those needing it, of securing sufficient funds, of carrying on the education work are to be solved by the teachers and trainers of tomorrow.*

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From its very beginning the Federal Government has manifested an interest in education. Federal interest in vocational preparation first took specific form in the Morrill Act of 1882 by which blocks of public lands were allocated to each state for the support of Agricultural and Mechanical colleges, but it was not until the turn of the present century that a movement was made for vocational education in our secondary schools. Seeing the need of vocational training in our public schools, many organizations began to advocate extended facilities and in 1916, the National Society for the promotion of Industrial Education was formed. In 1911 this organization adopted and issued a statement of the provisions it believed should be incorporated in legislation giving Federal aid for vocational education. The congress of 1914 authorized the appointment of a commission in national aid to vocational education. This commission's report was delayed until 1917, but during that time it had gained much attention and influence; thus, causing the Smith-Hughes Act providing Federal funds for distribution to the states for vocational education in public schools of less than the college grade to be passed. The funds made were for the promotion of two vocational fields—agriculture, and trades and industries, with home economics under the head of trades and industries of not exceeding 20 percent of the allotment to trades and industries. The funds were specified as available for the reimbursements of the salaries to teachers, supervisors, and directors of agricultural trade, home economics, and industrial subjects in schools of less than college grade and these reimbursements might not exceed one half of the salaries of the personnel specified above, also included in the appropriation was a sum for the support of training teachers of vocational subjects.

The funds were to be appropriated for vocational education in agriculture on the basis of the State's rural population and for trades and industries on urban population. The maximum of

these funds was reached in 1926, giving each field \$3,000,000. The appropriation for the teacher training reached its maximum of \$1,000,000 in 1921 and was to be distributed to the states on the basis of total population. The annual appropriation of \$200,000 was made to the Federal Board for vocational education from the 000 in 1921 and was to be distributed to the states under the act, but in 1934 the \$2,000,000 for administering the act was changed from a continuing appropriation to an authorization for an appropriation.

To the above allotments were added a provision for a minimum appropriation to those States that would receive amount insufficient for the operation of any program on the basis of total population ratios. These minimums to the States were set at \$5,000 each in the 2 major fields and in teacher training for the first few years, and \$10,000 thereafter.

At first, the Smith-Hughes included only the States but it now includes Hawaii and Puerto Rico as well as all the states of the U. S. The grand total of the Smith-Hughes Act amounted to \$7,502,000 distributed as follows: \$7,000,000 to state allotments, \$167,000 to provide minimum allotments to the states; \$200,000 for administrative expenses in the Federal Agency; and \$135,000 for Hawaii and Puerto Rico.

In 1929 Congress passed the George-Reed act authorizing additional appropriations to supplement the Smith-Hughes Act. This was divided equally for vocational agricultural education and home economics. The distribution of funds for vocational agricultural education was based on total farm population and for home economics on total rural population. This act carried no authorization for continuing appropriations beyond the fiscal year 1934 in which the maximum was reached.

In 1934 the leaders of Vocational Education were looking forward to a reduction of the program due to a discontinuance of the George-Reed

continued on page twenty-three

# Effects and Control of the Pickle Worm

By F. K. HINNANT, '41

The pickle worm known to entomologists as *Diaphanianitidalis* (Stoll.) is the larva of a small yellowish brown and yellow spotted moth. The worms, when full grown, are greenish or yellowish all over except for the brown head and brown area just behind the head, although younger larvae have black spots scattered evenly over the body.

For about two weeks after hatching the young larva wander around feeding, and may injure several fruits of the plants infested during this time. At the end of this period, it pupates and spends the next week or ten days in a thin cocoon after which the adult moth emerges ready to continue the species.

As a rule this pest does its greatest damage on those cucurbits planted in late summer and early fall although a few of the early season crop may receive an attack from those insects surviving the winter. Squash is probably the most attractive host and receives important injury on early plantings.

The worm hibernates in the pupal stage, surrounded by a thin cocoon of silk and usually in a roll of leaf from the food plant. Some entomologists believe that the insect does not pass the winter in South Carolina but that it overwinters farther south and migrates north in the spring.

The worm attacks the fruit of the cucurbits, infesting all sizes without apparent discrimination. It goes directly to the interior where it consumes an enormous quantity of pulp and developing seed, rendering the fruit valueless for human consumption. On small fruits feeding is often so extensive that only the thin outer rind remains.

Relatively little research has been done on the pickle worm in South Carolina heretofore, but because of the importance of cucurbits in the Edisto section of South Carolina and their potential possibilities as late season crops, the Entomology Department of the Edisto Experiment Station, headed by Mr. J. G. Watts, Assistant Entomologist, has conducted some experiments during the past summer in an effort to discover an effective and practical control.

Trap plantings of squash have been recommended to lessen damage to commercial varieties of less susceptible cantaloupes and cucumbers. However, the actual value of such a practice is questioned by some investigators. Use of these trap plantings require frequent destruction of fruits and flowers so that they will not become a potential source of more worms.

Several stomach poisons at concentrations which are effective against many other insects did not give satisfactory control of the pickle worm. The reason for this exceptional tolerance is not known, but is probably due to some complex physiological and digestive activities. The rapidity, with which the worm penetrates the outer skin of the fruit is important because it is only during this time that they can be reached with an insecticide.

Arsenate of lead at ten percent concentration is effective in that it gives partial control. Natural and synthetic cryolite at concentrations from ten to fifty percent have also given encouraging results.

On basis of work to date, relatively strong concentrations of insecticides will be required to give desired control.

THE AGRARIAN

## AGRI-FACTS

By E. C. TRUETT, JR., '42

★ Approximately 60 percent of the world's total population is now engaged in war.

★ It is more important to plant when the land is right than when the moon is right.

★ Agriculture uses 10 to 13 percent of all steel consumed in this country.

★ South Carolina's rural population is greater than the entire population of South Carolina one hundred years ago.

★ Lasting success in farming is achieved by doing the usual things unusually well.



# Our Vanishing Lands

By E. P. HUGUENIN, JR., '41

"Scars left by exploitation, fire and ignorance can again flourish under a cover of green."

The first settlers to this country were faced with, upon their arrival, a forest that has never been equalled for size, beauty or variety. With these early pioneers came axes, saws, hatchets and an ignorance of forestry the results of which we are today reaping in the form of floods, dust storms and abnormal weather conditions.

After the country had been settled to some extent the "lumberman" came upon the scene. Prodigal, ruthless, and eager to be quickly rich. And why not? There was so much timber. By present stands these early forest exploiters had few forest scruples. Conservation, stream protection, erosion prevention, and permanent timber replacement never once entered their heads, as a practical possibility. These men took the cream—leaving all the trees that showed even a trace of brown where they fell. They took only the best and moved on.

The farmers were the next to arrive. The quicker they cleared the land the better. They wanted fields to grow corn, not acres and acres of pine and oak. There was no tradition of forest as a crop, when this movement was on. Trees were an encumbrance or at the most only a temporary resource. "Cut them and make farms"—they cried, "The destiny of all land."

When the trees went erosion arrived. In nature erosion is a beneficent process without which the world could not long survive. But this same process accelerated by human hands has become one of the most deadly and destructive forces ever released. What is usually known as "geological erosion" or "denudation," is a universal phenomena; which through thousands and thousands of years has shaped the earth.

In the United States the problem is as great as in South Africa where according to General J. G. Smuts "Erosion is the biggest problem confronting the country, bigger than any politics." As all of us know, the importance of politics this will give one some idea of the vast magnitude of this problem. A nation can eke out a bare existence if they lack iron, coal, or some other necessity but one can't buy fertile soil. Where erosion is present in any large amount fertile soil is noticeable only by its complete absence.

Nor is the extinction of a nation by erosion an improbability that may occur at some future date, it has occurred in the past. The downfall of many great nations has been directly attributed to the ravages of the insidious thief.

Now to come home with examples. During the World War over forty million acres of new land in the United States were brought under the plow. The vast majority of this same land was discarded as soon as debts, tariffs and nationalism barred their produce from foreign markets. Today much of these forty million acres has been eroded beyond repair or has become "submarginal" to be left for time and mother nature to restore to fertility. Another example is in our sister state, Georgia. Stuart Chase in "Rich Land, Poor Land," describes how a chasm 3,000 acres in extent and 200 feet deep came into existence. A careless farmer, with whom we are plentifully supplied, allowed the water that was running off his barn roof to form a small gully. Before he knew what was happening, the gully was beyond control. Then after every rain it became a torrent that tore away soil and sub-soil over a wide area, flinging whole farmsteads into its ever increasing maw. Our farmers will have to wake up to the fact that a fertile soil is the same thing as money in the bank, an enjoyment as well as a constant source of supply. When this becomes a fact we will have gone a long way toward solving all problems of farming.

UNIFORMS

★

WILLIAM C. ROWLAND

★

MILITARY EQUIPMENT

# Cottonseed Hulls -- A Worthy Product

By E. C. TRUETT, JR., '41

In the early days of the cotton oil mills, efforts were concentrated on obtaining oil and cake from cottonseed. The hulls which form the protective covering for the heart of the seed were regarded as a great obstacle since they made it difficult to use what was on the inside. For a great many years, hulls were thrown away or burned by the mills as fuel.

Livestock were the first to discover the value of cottonseed hulls. In the early days, oxen were one of the chief forms of power used around the mills, and it was noted that these animals would eat hulls left lying around within their reach. Other livestock did the same. Thus hulls, like the cottonseed cake and meal, came into use as a livestock feed.

Cottonseed hulls, however, are a different type of feed than the cake and meal. Hulls are a carbonaceous roughage rather than a protein concentrate. Many years of experimental and practical feeding were carried on before the place of hulls in the feeding picture became established. In feeding value, hulls are comparable to dry grass hay. They are being used extensively as a roughage for beef cattle, dairy cattle, work stock and sheep. These are fed mostly during the winter months.

Hulls are fed in conjunction with cottonseed meal and farm grains. In some cases idle work stock, for example, hulls and meal alone have been found sufficient to maintain these animals in good condition. Hulls are bulky which makes them especially suitable for mixing with many of the concentrates in feeding cattle. Concentrates usually become heavy when moistened but when hulls are added, the mixture is kept porous and thus more easily can it be reached by digestive juices. Many mills, because of their desirability in feed mixtures, are preparing a mixture consisting of four parts hulls and one part cottonseed meal. They are also being used as an ingredient of commercial mixed feeds.

By far the greatest per cent of cottonseed hulls is used in feeding livestock. Hulls also have a number of uses other than as a feed. Sometimes they are mixed with cottonseed meal and applied as a fertilizer, especially where there's a need to loosen up "tight" soil. Many poultryman are using them on the floors of their poul-

try houses. As hulls have the ability to absorb and hold moisture, a layer of two or three inches thick on the poultry house floor insures a drier and more sanitary condition for the chickens. When removed, the mixture of hulls and droppings make an excellent fertilizer.

Western farmers, in the summer of 1937, used cottonseed hulls in their gallant fight against grasshoppers. The hulls were mixed with poison after being ground up very fine. This mixture was spread over the fields in hopper-infested areas, this was done in some instances by planes. As hulls are very light, they proved to be excellent carriers. They also are much more economical than bran which has ordinarily been used for the purpose.

Cottonseed hulls are also finding their way into industry. One of the first uses was as a stuffing material. They are being used in much the same way as straw, excelsior or sawdust. More recently, hulls have been employed in the construction on concrete highways and walks. Hulls, because of their retention of moisture being greater than many materials, are moistened and spread over concrete after it is poured. The hulls prevent the concrete from drying too quickly and thereby contribute to a firm, permanent "set".

As in the case of the cottonseed cake and meal, it is likely that scientific research will find many new and varied uses for cottonseed hulls. In the near future, they may contribute much to the comfort of our modern homes. Experiments have been made which indicate that hulls may become useful as an insulating material. Hulls are very poor conductors of heat or cold, therefore, they may be used someday between the inner and outer walls of buildings to keep out both summer heat and winter cold.

That hulls contain a large percentage of cellulose is another reason why we may look for them to play an increasingly important role in industry. We already know that cellulose is the base of hundreds of the products of chemical science. Thus, from a waste material, that use to be thrown away or used as fuel, hulls have advanced to a position of great usefulness and yet there are many indications that their usefulness will become even greater in the future.





# BETWEEN THE

## Agricultural Education Seniors Interviewed

Mr. T. L. Ayers and E. D. White of the Agricultural Adjustment Administration, United States Department of Agriculture, were at Clemson to hold conferences with the seniors who are majoring in Agricultural Education.

At these conferences there were round-table discussions of the many economic problems facing the Southern farmer today. Vocational Education teachers are expected to offer to the farmers instructions on these problems which are of international importance.

Verd Peterson, State Supervisor of Agricultural Education, Miss Lillian Hoffman, State Supervisor of Home Economics, and J. L. Sutherland, Assistant State Supervisor of Agricultural Education, are cooperating with the teacher training staff of Agricultural Education and the conference.

THE AGRARIAN

## Animal Husbandry Club Has Successful Year

The Animal Husbandry Club has completed one of its most successful years since its organization. The club has sponsored a local judging contest, and trips to New Orleans and Chicago.

Due to a lack of time and material, the club has had to postpone its "Little International Livestock Show", until next year.

## DuPre to Manage for Carnation Milk Company

William DuPre, Dairy graduate of '38, will become manager of the new Carnation Milk Company plant at Shelby, N. C. on May 15. DuPre has been employed as supervisor of the Dairy Herd Improvement Association for the lower Piedmont Area.

THE AGRARIAN

## Geology Class Takes Field Trip

The Geology class of Clemson, headed by Professor Robert E. Gee, recently went on a field trip which lasted for three days and covered approximately 1000 miles within the State. Leaving school, the group first visited the Laurens Glass Factory in Laurens, S. C. From there, they went by way of the Buzzard Roost Hydr-Electric Plant, now under construction near Greenwood, and the Kaolin works near Aiken, to Columbia, where they spent the first night.

On the next day, the class went to Poinsett State Park, Santee-Cooper, Eutaw Springs, lime deposits near Holly Hill, and Charleston. The last day, they came by Hale Gold Mine near Kershaw and saw the process of gold mining.

Throughout the entire trip, the group paid particular attention to the different soil types and formations, found in different sections of South Carolina.

## GLEANED HEAR—AND THERE

1. The farmer who looks ahead in the spring for good methods doesn't look back in the fall on poor results.

2. Rusting out is worse than wearing out. This is true of farmers machines and farmers minds.

3. Good farmers are not found where the land is poor. Think that through and decide which is cause and which is result.

4. The farmer who reads farm bulletins learns how to reduce the high cost of ignorant farming.

5. Paying taxes on idle land that could be producing trees is certainly poor economy.

6. A best way to serve your community is to strive to be the best farmer in the community.

7. Can Southern farmers call themselves good farmers as long as there is a hungry home market for eggs, poultry, butter, and vegetables.

8. Southern soils, badly in need of humus, cry out against spring burning of cornstalks and other crops refuse. For the land's sake turn it under.

9. A farmer who keeps businesslike records will find his banker more willing to talk business.



## FURROWS

### A. S. A. E. Selects Leaders

R. J. Berry was elected president of the American Society of Agricultural Engineers at the regular meeting held Wednesday, May 8. C. J. Bethea was named vice-president, and F. E. Rogers was chosen secretary-treasurer.

The new officials succeed W. J. Oates, of Chester; H. E. Ward, of Darlington; and R. L. Hearon, of Bishopville.

— THE AGRARIAN —

### Fenstemacher to Mississippi

Ed Fenstemacher, Senior in Dairying, has accepted a position with the Pet Milk Company. He will assume his new duties in Mississippi.

— THE AGRARIAN —

### Baker Accepts Position at Hartwell, S. C.

Jesse M. Baker, Agronomy major from Hemingway, S. C. and retiring Agronomy Departmental Editor of the Agrarian, has accepted a position with the Plant Pathology Department of the Coker Pedigreed Seed Co., Hartsville. Baker's affiliations with this organization are to begin immediately after his graduation in June, however he is going to take special training in Plant Pathology at Clemson this summer before reporting to Hartsville in October.

### Dairy Club Elects Officers

At the last meeting of the Clemson Dairy Club, which was organized in 1922 by Professor Goodale, the officers for next year were elected President, J. B. Guess; Vice-President, E. L. Young; Secretary-Treasurer, W. M. Hobson. The club this year has compiled a "Dairy Alumni Directory", which has been unanimously satisfactory.

The students who are majoring in Dairying and who belong to the Student Chapter of the American Dairy Science Association gave a banquet in the college dining hall on Thursday, April twenty-fifth.

— THE AGRARIAN —

### Gray to Supervise in Greenville

Fred Gray, Senior in Dairying, from Franklin, N. C., will become supervisor of the Greenville County Dairy Herd Improvement Association immediately after graduation.

— THE AGRARIAN —

### Fellowship Awarded Arrington

Bob Arrington, Dairy Senior from Ninety Six, has been awarded a one-year Fellowship at V. P. I., where he will work on his Master's Degree.

10. The wise poultry raiser knows that early hatches catch the biggest profits.

11. Since it costs as much to grow a poor crop from inferior seed as a good crop from purebred seed, the differences is profit.

12. Water run-off has to walk-off if you have a good terrace.

13. "The glory of the farmer is that in the divisions of labor it is his part to create. He obtains from the earth the bread and the meat, the food which was not he causes to be."— "Ralph Waldo Emerson."

14. Progressive townspeople are always interested in seeing the farmers prosper.

15. It is a poor system of farming indeed when the farmer depends upon one crop for his yearly income.

16. One treasure that a man can dig up out of his own backyard is a healthful diet of fresh vegetables.

17. Most big farmers were once little farmers who had ideas and energy.

18. As far as the east is from the west, so far is the scrub from the purebred.

19. A good pasture is a lot more than an exercise lot with a fence around it.



## *History of Alpha Zeta at Clemson*

By L. R. ARRINGTON, '40

Alpha Zeta is the national honorary fraternity for undergraduate students in Agriculture. Among the aims and purposes of this fraternity is the establishment and development of high standards of scholarship and leadership among its members and other students and the development of a spirit of fellowship between the students and faculty.

The chapter for South Carolina was organized at Clemson in 1930, and is known as the South Carolina Chapter of Alpha Zeta. It was the thirty-ninth organization in the present number of forty two which are distributed throughout the Land Grant Colleges of the United States. The development of the chapter grew out of the desire of nine or ten Clemson College faculty members of Alpha Zeta at some other school and who were aware of the need of the Clemson Agricultural Students. Ten outstanding agricultural seniors of the Class of 1928 were elected to work with the Alpha Zeta faculty members in considering the proposed fraternity. The outcome of this work was a local Alpha Zeta modeled fraternity christened **Alpha Sigma**, signifying Agricultural Science. This organization, although short lived, was the basis upon which the present South Carolina Chapter of Alpha Zeta was constructed. In December 1929, the membership of **Alpha Sigma** submitted to the National Alpha Zeta conclave a petition for a South Carolina Chapter. The petition was accepted, the college inspected by a member of the High Council, a favorable report submitted, and the date of April 19, 1930 set for the formal installation.

Nineteen of the twenty nine members of **Alpha Sigma** became members of this fraternity. Two of the charter members are now faculty members of this same chapter. Membership today includes active members and faculty members. Membership in this fraternity is offered to all junior and senior students in the school of Agriculture who stand in the upper portion of their class scholastically, and who in the opinion of the fraternity members have high qualities of leadership and character.

☆ Farming plans that aren't shot through with intelligence will be shot through with failure.

## *Purpose and Activities of 4-H at Clemson*

By B. R. LEONARD, '42

The Clemson College 4-H Club was organized in 1930 by the cadets of Clemson College, who, having previously been members of the state 4-H clubs, were interested in keeping up the spirit for which the club is noted. Thirty-two charter members were enrolled in the first college club. Mr. Leon Clayton, now state assistant 4-H club agent, was the first president of the club. Of the thirty-two charter members, the majority are now in the Extension Service, or are prominent farmers in South Carolina.

The main purpose of the club is to develop leadership qualities and activities that were begun back in the home communities. This is accomplished in the college 4-H club by the students actually preparing and conducting programs and by taking part in the club activities.

With the motto of the club, "To Make The Best Better," we are inspired to continue the four-fold development of the head, heart, hand, and health of rural boys and girls.

There are now enrolled in the Clemson 4-H Club forty-five active members. The club holds two meetings monthly. These meetings are carried out by 4-H club members, members of the faculty, and noted educators. Discussions are

continued on page sixteen



# Mechanization in the South

By C. H. TRIPLETT, '40

The South of today is in a period of transition. Such a period is always one of readjustment, presenting many complex problems which call for ingenuity, special training, and much thinking to solve.

The change that the farmers of the South are making is a change from animal power to power machinery. Many farmers are not making a gradual change, but are trying to make the transition in one stride, giving no thought to their own particular situation and problems, but merely saying in effect, "My neighbor uses a tractor profitably, why shouldn't I?" This is the key question to the whole situation, and no one should buy any machine before this question is answered satisfactorily.

In the mid-western states, power machinery is far ahead of animal power. We in the South must realize that this section has always been more or less a testing ground for the machinery companies, and that consequently the use of power equipment developed gradually as the machinery companies themselves developed. The transition from mule power to tractor power has taken place over a number of years, therefore these farmers felt their way along cautiously, discarding that which was impractical and using that which was profitable.

However we in the South were having profitable years while this change was taking place in the midwest, and we saw no reason for changing our methods of seeding, cultivating, and harvesting. With the changing conditions however, we have had to use every method in sight to decrease our expenses. Looking around, we saw some advertisements which were meant for the mid-west farmers, "Use tractors for more economical farming." Without thought, many southern farmers bought these machines and implements which were totally unsuited for our type of farming, and consequently they quickly went broke. Wherefore we began clamoring for machinery which was designed for our type of farms and farming.

Now there are many companies manufacturing equipment designed especially for the Southern farm. This does not mean that they are designed for every Southern farm however, for there are many farms upon which it would

be impractical to use this equipment. Before making such a radical change, the farmer should sit down and put on paper the cost of seeding, cultivation, and harvesting, how long does it take, and the labor required. Then he should figure whether power equipment would help him by decreasing the time and labor requirements, whether he could handle a more diversified system of farming, and whether and how long it will take the equipment to pay for itself. With these questions answered, the farmer should be able to tell exactly whether or not he should attempt the transition from animal power to power machinery.

★ France uses large quantities of dilute sulphuric acid for the control of weeds.

★ "He who hath never heard the 'voice of the trees' is poor in knowledge".

• F O R S A L E •

**BULL CALVES**

JERSEY GUERNSEY HOLSTEIN

**DAIRY DEPARTMENT**



## PURPOSE AND ACTIVITIES OF THE CLEMSON 4-H CLUB

continued from page fourteen

held by members on subjects of interest to rural youth. The College 4-H Club seeks the broad educational development of boys and girls, emphasizing better agriculture, homemaking, and rural life.

The retiring officers for this year have done much in making the club one of the most active on the college campus. They are: F. E. Wells, president; H. B. Mays, vice-president; L. E. Lanford, corresponding secretary; G. W. Jones secretary-treasurer; and B. R. Leonard as Sgt.-of Arms. Through these, and with the full cooperation of the club, the organization has made rapid strides toward a bigger and better club. The newly-elected officers for next year are as enthusiastic over the possibilities of the club as were any who have gone before. These officers are: G. W. Jones, president; C. M. Eaddy, vice-president; K. J. Bodie, corresponding secretary; B. R. Leonard, secretary-treasurer; and Arthur Flowers as Sgt.-of-Arms.

The activities of the college 4-H club for the past ten years have netted many achievements. Some of these accomplishments are as follows:

1. Erection of a booth during the agricultural field day.

2. Assistance to state 4-H club agents with county and district 4-H meetings.

3. Exhibit booths and demonstrations at the State Fair annually.

4. Exchange of programs of educational and social value with the Winthrop College 4-H club annually.

5. Presentation of programs for community club groups.

6. Renderance of fellowship services to former 4-H club members entering Clemson College.

7. Adoption of a constitution and by-laws for the club.

8. Adoption of a standard key for which members are eligible.

9. Service as sponsor for the **Recreational Institute** conducted at Clemson in 1938.

10. Served as joint host with the Winthrop 4-H Club in sponsoring the first Interstate Collegiate 4-H Conference, comprising students from Georgia, North Carolina, and South Carolina. This conference has developed into an annual occasion held at Camp Long, state 4-H camp, located near Aiken, S. C. The purpose of this Interstate Collegiate Conference are as follows:

(a) 1. To provide social opportunity.

(b) 2. To better understand the significance of the college 4-H club.

(c) 3. To maintain interest in the Extension Service and further develop its programs.

(d) 4. To provide further opportunity for leadership development.

(e) 5. To better understand problems confronting rural college students.

Between the regular instructional phases of the conference program, the students attending enjoyed free time activities consisting of playground games, boating, swimming, and other forms of recreation. Music and group singing were interspersed throughout the program.

The college 4-H club which was organized by the students who were former 4-H club members are striving ever to keep up the spirit for which the club is noted; to develop leadership among its members, to maintain interest in extension work which was so notably begun by our forerunners, and to live by the club motto "To Make The Best Better." This is only attained by using the best we have. It is through cooperation of local leaders and fellow students in the club that has given us the organization of a college 4-H club. In the years to follow there are many problems to face and solve, but we ever look for a solution that will serve to make the rural communities of America better.



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# Mr. Farmer Meets the Tariff

By G. A. STOUDEMIRE, '40

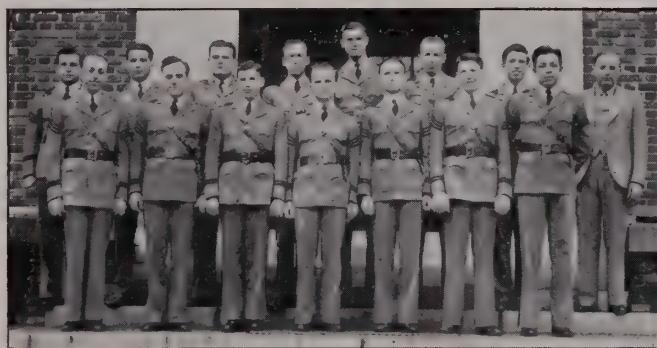
. . . "What are we, the cotton farmers of America, going to do about abolishing, correcting and lowering the American protective tariff?" . . .

A few years ago Secretary Cordell Hull made the statement that economic education is one of the world's greatest needs. With this thought in mind, Mr. J. N. Lipscomb, Professor of Agricultural Economics, and Mr. V. G. Martin, Professor of Vocational Agricultural Education, Mississippi State College, set out to devise some means of acquainting the American cotton farmer with some of the handicaps placed on him by our American protective tariff system.

These two men, because of their positions, have had opportunity through the years to work with many southern cotton farmers. They have observed the slow and difficult progress made with these farmers when the lecture and conference methods of teaching are the only means of getting information to them. In order to put the tariff information before the farmers more quickly and effectively, they determined to present it in an entertaining way.

Out of this decision came "Mr. Farmer Meets The Tariff", an educational comedy in three acts. The play centers around Mr. Cotton Farmer, a typical farmer of the Cotton Belt. For a number of years Mr. and Mrs. Cotton Farmer has been unable to sell all of their cotton in the United States and had received a low price for the cotton they did sell. The old saying, "The pasture look greener on the other side of the fence" certainly applies to Mr. and Mrs. Cotton Farmer. Ignorant of the tariff regulations, they traveled abroad to sell their surplus cotton and were amazed at the prevailing high prices. This indeed was the solution to their problem, they thought. The foreign cotton brokers explained that they could not pay cash for this fine American cotton, but that they could give Mr. and Mrs. Cotton Farmer foreign commodities equivalent to the money. This met with the hearty approval of the American couple for not only could they buy things they had never been able to afford, but they could also bring some things home and sell them to their neighbors at a profit. But—their own Uncle Sam and the

The cast of Clemson students



customs officers met them at the dock. After many trying experiences with the workings of the tariff regulations, they were forced to leave their cherished purchases at the customs house because of insufficient funds with which to pay the high duties. These experiences led them to see the tariff as a curse to the southern farmer. The last part of the play depicts the political activities of Mr. and Mrs. Cotton Farmer in their home community as they work to send congressmen to Washington who will use their influence to remove the burden of the tariff from the shoulders of the cotton farmer.

The play was first dramatized by the Collegiate Chapter of F. F. A. of the Mississippi State College. This group of students was granted permission to present the play before the Southern Regional Conference of Agricultural Education Workers at Little Rock, Arkansas, April, 1939. Mr. W. G. Crandall, Head of the Department of Agricultural Education of Clemson College, attended the conference in Little Rock and brought back news of the enthusiastic reception of this educational comedy. The Clemson Collegiate Chapter of Future Farmers of America, having as two of its objectives the education and development of the abilities of its members, decided to present "Mr. Farmer Meets The Tariff" in South Carolina.

The Agricultural Education faculty selected

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## MR. FARMER MEETS THE TARIFF

continued from page seventeen

the cast from senior members of the Collegiate F. F. A. Chapter. Members of the cast were as follows: Mr. Cotton Farmer, L. G. Hannah; Mrs. Cotton Farmer, S. B. Williams; Mr. U. S. Cotton Spinner, J. B. Earle; Mr. John Bull Cotton Spinner, J. W. Johnson; Mr. Fritz H. Spinner, S. W. Epting; Mr. Tokyo Y. Spinner, M. L. Bridges; Monsieur Z. Spinner, S. H. Pruitt; Uncle Sam, J. R. Carter; U. S. Tariff Inspector, I. C. Redfern; First Tariff Clerk, F. E. Wells; Second Tariff Clerk, P. C. Ballenger; Dr. Galvensky, Agricultural Economist, G. A. Stoudemire; Mr. Booster, Candidate for Congress, R. W. Ballentine. The play was directed by Dr. T. A. White, Professor of Agricultural Education, and a student assistant, Cadet L. E. Lanford.

The play was presented to large groups of rural people at several of the evening class centers where seniors majoring in Agricultural Education hold evening class meetings with farmers in this section of the State. "Mr. Farmer Meets The Tariff" proved to be both entertaining and educational to these people. Many of them commented that the play made clear to them just what the tariff really means.

From these evening-class centers, the play moved on to larger fields. Mr. E. R. Alexander, Program Director for the South Carolina Vocational Association, invited the cast to present the play before the South Carolina Vocational Teachers' Convention held in Greenville, S. C., on March 13. All seniors majoring in Agricultural Education accompanied the cast to Greenville. At this presentation of "Mr. Farmer Meets The Tariff", the audience was made up of the state and district supervisors of vocational education and the agriculture and home economics teachers from all sections of the State. From that date, many requests were received for the play to be presented at various high schools and meetings of agricultural groups. All these requests could not be accepted, but the play was presented as many times as could be arranged.

The cast took an unusual interest in presenting the play before seniors majoring in home economics and others at Winthrop College. Here, as in many other places, the boys were entertained royally.

Due to the requests of various professors and students, plans are being made to present the

play here at Clemson in the agricultural auditorium in the near future.

It is the opinion of many who have seen this play that it is one of the most effective ways of showing our people the real meaning of the tariff as it now works. The problem for us is "What are we the cotton farmers of America, going to do about abolishing, correcting or lowering the American protective tariff?"

THE AGRARIAN

## SHEEP FOR SOUTH CAROLINA

There was a time when millions of sheep roamed the farm lands of the South. In those days practically every farm kept a flock. Then came the specialized fat lamb industry of the Great Western Plains and the fine wool sheep development of the arid regions. This along with the dogs, parasites, and the natural disadvantages that a smaller flock possesses virtually drove the Southern sheepman out of existence.

But a new day is dawning for the Dixie shepherd. An enlightened public opinion is "curbing the cur." The development of simple, inexpensive ways of controlling the parasite is rapidly removing this obstacle to the production of sheep. And the discovery that our pastures produce 65 percent of their nutritive value by June 15, points to spring lambs as the most practical stock for harvesting this herbage. These developments, with the fact that superior sheep from the standpoint of mutton and wool are now available is making sheep a consistently profitable livestock venture.

## HEYWARD MAHON CO.

*"Clemson Headquarters in Greenville"*

GREENVILLE

*South Carolina's Predominating Store for*

*Men and Young Men*



## GUEST EDITORIAL

continued from page seven

Table 3.—Comparison of Lime Consumption in Seven Southeastern Cotton States with Other Regions, 1937

State	Tons	Pounds oxide per acre	Percent of U.S.
States producing little or no cotton			
Pennsylvania	467,007	67.1	6.9
New York	314,500	39.7	4.6
Wisconsin	600,000	50.3	8.8
Iowa	432,373	17.1	6.4
Illinois	1,044,834	41.5	15.4
Kentucky	819,432	99.6	12.0
Virginia	289,878	59.6	4.3
Tennessee	413,910	45.0	6.1
Southeastern cotton states			
North Carolina	136,242	18.8	2.0
South Carolina	57,147	10.8	.8
Florida	53,986	24.7	.8
Alabama	45,771	5.3	.7
Georgia	24,332	2.3	.4
Louisiana	7,291	1.5	.1
Mississippi	6,799	0.9	.1
Total	331,568	—	4.9
United States	6,800,735		

zinc, iron, copper and boron. Only small quantities of these minor nutrient elements are needed for optimum growth of plants. Excessive amounts in the soil solution may be very toxic to certain crops plants. High soil acidity favors the solubility of such materials which may be removed from the soil by leaching. The leaching of excessive amounts of the material which might be toxic results in the soil reaching an equilibrium suitable for the growth of plants. In certain soils leaching removes most of certain minor nutrients, causing crops and animals to develop certain minor nutrient deficiency symptoms.

It is recognized that there are a number of important factors to work out in connection with a general liming program, as excessive amounts of lime may significantly decrease the availability of certain minor nutrients. It is often necessary to apply to the soil some of the minor nutrients in addition to lime to maintain a balanced nutrient complex in the soil. These minor elements can be added readily and cheaply when their need is demonstrated.

Since the unusual or exceptional case of soil injury from liming can be easily corrected, it should not discourage a general liming program which will make it possible to produce the quantity and quality of feed crops necessary for successful livestock enterprises. Soil scientists sometimes become absorbed in the exceptional cases and lose sight of the main issue. This attitude has been a significant factor in delaying the development of a broad liming program which is such a serious limiting factor in the agricultural development of the Southwestern States. If the excessive soil acidity of our soil is not eliminated we shall be forced to continue our present general system of agriculture or abandon large acreages and let the land revert to forest. The solution of some of these problems requires technical skill as well as available capital.

## Production of Livestock

The South is deficient in quantity and quality of livestock products. The Southern livestock industry is becoming more permanently established as we recognize and correct the limiting factors in the industry. It is not possible to establish a profitable livestock enterprise without an adequate supply of high-grade feed crops. It is now generally realized that inadequate mineral content of feed crops has been a major obstacle in the establishment of the needed livestock industry in the South.

Very significant and far-reaching developments are occurring in the field of animal nutrition. Many problems also have arisen from the modern methods of production, manufacturing, and preserving of foodstuffs, and from specialization and the reduction in the number of food crops produced in certain regions. Depleted soils have produced food crops deficient in vitamin and mineral nutrients such as calcium and phosphorus. The intensive production of crops and animals presents problems not encountered in ordinary farm flocks and herds. The intensification of livestock enterprises requires rapid growth, early maturity, and high production. Such enterprises demand a varied and well-balanced food supply.

In the selection of an adequate food supply it is necessary to consider the nature of the protein supply, the kinds and amounts of mineral and the various vitamins required. The recent specialization has presented nutritional problems not previously considered very significant under systems where there was low production. These problems have stimulated research which has been responsible for many of the modern developments in nutrition.

The field of nutrition is constantly expanding. Each new discovery reveals new fields to explore.

The recent finds by the Florida Experiment Station that copper, manganese, zinc, and cobalt are important factors in nutrition have called attention to the significance of the minor mineral nutrients in nutrition of animals. The deficiency disease problem is of particular importance in the South where optimum dietary food combinations are often lacking.

## Human Nutrition

Human nutrition is a major problem in the South. Since our political, social and economic conditions have fostered the development of highly specialized cash crop systems of agriculture we have grown only a limited number of high grade food crops. The depletion of the fertility of the soil has resulted in the production of certain crops low in essential mineral nutrients. Such crops also produce low quality of organic nutrients such as proteins, carbohydrates and fats. Quality in addition to quantity is a necessary prerequisite in the human diet. It is very gratifying to note the large number of fine papers on this subject. The nutrition of the underprivileged classes in our society is one of our major problems. It is the ultimate goal of our agricultural program to feed and clothe properly our population.

The poor nutrition due to inadequate diet and the presence of food deficiency diseases are a tremendous drain on the economic and social life of the South. It is encouraging to note the very fine efforts and the progress which are being made in the solution of some of the nutritional problems of our people.

In spite of the fact that the South has the five major bases of a great civilization it has been stated that the South is very rich and the Southerners very poor. The South possesses the two primary bases, natural wealth and human wealth, but it has not developed the three secondary bases including technical skills, artificial wealth—money, capital, credit—and institutional services. High tariff, discrimination in freight rates and a marked deficiency of Federal government expenditures in the South have been significant factors in preventing the development of technical skills, the accumulation of capital, and the establishment of institutional services.

The South has been producing low priced raw material to be finished in other regions using high priced skilled labor in the manufacture of the finished products. The selling of low priced raw products and the purchase of high priced finished products has resulted in a tremendous economic loss to the South both in capital and people. The lack of opportunities in the field of skilled labor has resulted in a movement of some of the most efficient of the surplus farm population out of the South in search of greater opportunities.

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## GUEST EDITORIAL

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The modern South is confronted with many and immensely complicated problems. The solution of these problems will call for much effort and sacrifice. With a knowledge of the major factors limiting the development of the resources of the South, it is possible to pursue a reasonably logical and intelligent course in its development.

It is the responsibility of the membership of this group to supply the leadership in the attainment of greater technical skills and in wider institutional services. With our natural resources and intelligent leadership the South can and must attain more diversified permanent systems of agriculture and industries which will provide a higher standard of living for its people.

— THE AGRARIAN —

★ That the first five years after the invention of the automobile, a whip-holder was included on the body.

★ When the population of South Carolina eats a meal, one out of every five is eating food furnished by the W.P.A.

★ Over 800,000 Southern farm families have no vitamin factories in the form of vegetable gardens.

## ORGANIC MATTER AND OUR SOILS

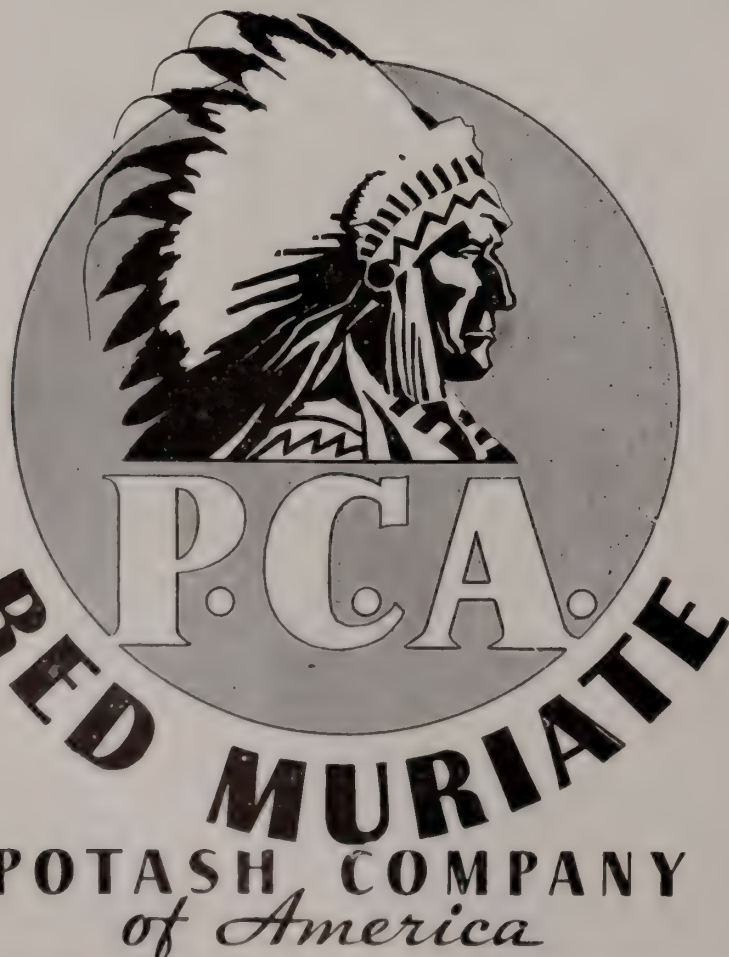
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organic amendments, but it is now becoming increasingly difficult to obtain them in quantity, so other sources have to be used. The practice of using composts of various kinds for adding organic matter to the soil is becoming popular because it offers a means of utilizing many waste materials to excellent advantage from both soil conditioning and soil fertility standpoints. Green manure crops are also very important sources of organic matter. It should be kept in mind when planning an organic matter conservation program, however, that fresh or undecomposed vegetable material rich in cellulose or other readily decomposed constituents is usually not satisfactory for direct use, because it greatly stimulates the growth of micro-organisms and may thus temporarily render nutrients in the soil unavailable for plant use. When making a compost out of such materials as straw, leaves, etc., it is often advisable to add nitrogenous fertilizer chemicals in order to hasten organic decomposition. Peat and muck have become important sources of organic material, but as yet their use can be recommended only in a general way as considerable experiment is needed to determine their suitability under varying conditions. Woody material as a source of organic matter should generally be avoided as it is very difficult to break down into a favorable condition and otherwise has harmful biological effects in the soil.

Soil organic matter is one of our most important national resources, and it must be given its proper rank in any conservation policy as one of the major factors affecting the levels of crop production in the future. The high productivity of most virgin soils has always been associated with their high content of organic matter, and the decrease in the supply with cultivation has generally been paralleled by a corresponding decrease in productivity. As these soils are constantly being depleted of their organic matter, with a resultant decrease in crop yields and net returns of profit per unit of land planted, it is important that we take drastic steps to keep this organic matter at a constant level in our soil in order to insure our economic security from the farming industry. In the future, careful conservation and thrifty management will be imperative if our soil is to yield even a moderate income.

— THE AGRARIAN —

★ The farmer's batting average in the farming game is indicated by the records he keeps which show the hits and errors made in his business.



GENERAL SALES OFFICE: BALTIMORE, MD. SOUTHERN SALES OFFICE: ATLANTA, GA.

## Livestock Notes

By M. I. JENKINS, '41.

### Give Your Pigs Plenty of Room

Growing pigs need enough space to allow freedom of movement, so they can get enough exercise to keep digestion and assimilation at the highest point of efficiency.

The following experiment shows that it pays to let pigs have at least a modest amount of room: One group of ten pigs was fed in a one acre dry lot. Another group was fed in a 250 square foot, floored pen. At the beginning of the experiment, each pig weighed 50 pounds each. The pigs in the dry lot made a daily gain of 1.72 pounds, and those in the pen made a daily gain of 1.59 pounds. It required 319 pounds of corn and 47 pounds of supplement for every 100 pounds of gain in the dry lot. (This cost \$4.49 per hundred pounds gain.) The feed required for 100 pounds of gain in the pen was 344 pounds of corn and 53 pounds of supplement. (At a cost of \$5.44.)

### Save Money by Fattening Steers on Cottonseed Meal and Hulls

A recent test shows that cottonseed hulls can profitably replace corn and hay for beef production when it is convenient to do so. Twenty steers weighing about 700 pounds each were divided into two equal groups. One lot received all the cottonseed hulls they could eat and one pound of meal for every 100 pounds of steer weight. The other lot was fed one pound of shelled corn per 100 pounds of steer weight and all the alfalfa hay they would eat. The first lot made an average daily gain of 2.22 pounds, while the corn fed steers gained only 2.10 pounds per day. It took 337 pounds of meal and 1068 pounds of hulls to produce 100 pounds of gain in the first lot. The second lot required 360 pounds of corn and 1060 pounds of alfalfa to produce 100 pounds of gain.

The feed cost for the lot fed on cottonseed feed was only about 45 percent of that of the corn fed lot. Careful studies also showed that the cottonseed fed lot produced carcasses that were equal to the corn fed steer's in quality, color, and palatability.

### Cross Bred Pigs Outgain Purebred Pigs In Experiment

Two purebred Poland China sows, that were bred to both a purebred Poland China boar and to a purebred Duroc Jersey Boar, produced purebred and crossbred pigs. Two other Poland China sows were bred to both of the boars, but they produced only purebred pigs.

At birth, the crossbred pigs averaged 2.81 pounds and at weaning time they averaged 38.7 pounds. The purebred pigs averaged 2.50 pounds at birth and 33.7 pounds at weaning time. Under similar feeding conditions, the purebred pigs averaged a daily gain of 1.40 pounds. These pigs required 329 pounds of feed per 100 pounds of gain. The average daily gain of the crossbred pigs was 1.58 pounds, and these pigs required only 318 pounds of feed to make a 100 pounds of gain.

THE AGRARIAN

### A SUCCESSFUL JERSEY FARM

continued from page three

products are sold at a road side market which is operated by Mr. G. C. Wheeler. Part of the milk is sold in Saluda under the Jersey Creamline Trademark; the remaining milk is separated and the cream sold as sweet cream in Columbia, S. C. and the skim milk used to feed the growing calves. The dairy takes pride in its chocolate milk which is well known throughout the state. The lettering on the bottle "Our Chocolate Drink is Delicious, Healthful, and Refreshing" is in no wise misleading to the many customers.

Through scientific breeding and management the Wheeler Brothers have made a reputation of which they are proud. This leadership in Jersey cattle breeding is being constantly improved with thoughtful plans for future development.

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ANDERSON

SOUTH CAROLINA



## LUBRICATION OF DIESEL ENGINES

continued from page four

hot spots, eventually weakening the babbitt structure to an extent where even nominal pressures will result in failure. A third type of bearing failure is that of poor bonding of the bearing material to shell proper. This is a type of failure that was once quite common, but one that has been almost eliminated. Research by bearing manufacturers has developed methods for bonding bearing material that have apparently solved this phase of the bearing problem. Another type of bearing failure, and one that unfortunately is common, is that of bearing corrosion. The direct cause of this type of failure with normal lubricating oil is again high temperature, which is proved by the fact that practically all types of crankcase lubricants and their products of decomposition at temperatures under 200 degrees Fahrenheit under normal service conditions are in themselves noncorrosive.

Another little considered cause in the development of high temperatures that eventually result in bearing failure is the use of crankcase lubricant for periods beyond their limits of useful life. The bearing problem seem to consist of the control of two main factors. First, the control of crankcase and operating temperature to a point where structural change of the bearing metal is minimized and the corrosive tendency of crankcase oils reduced to assure a sufficient safety factor; and second, the elimination, so far as possible, of the imbedding of foreign material in the bearing.

In this day of controversial opinion, it is also of interest to mention crankcase oil filtration or purification. The use of effective methods of filtration is of the utmost importance and, without question, has a definite place in the scheme of lubrication. It is important to point out here that the main function of a lubrication oil filter is the removal of solid contamination from the lubricating oil. The difficulties encountered in the use of filters have been largely due to misleading advertising by various filter manufacturers. A filter should be considered as a means of removing solids from an oil without any beneficial refining influence.

In conclusion, it can be said that in spite of the amazing progress made in recent years in the field of lubrication, this field of endeavor is still in its infancy. Much remains to be done by the engine builder and manufacturer.



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THE AGRARIAN

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## FEDERAL AID AND EDUCATION

continued from page eight

appropriations, but Congress was persuaded in that year to pass the George-Ellzey Act which authorized a \$3,000,000 appropriation for each of the ensuing years 1935, 1936, and 1937. This amount was to be divided equally between vocational agricultural education, trades and industries, and home economics and allotted to the States and Territories on the basis of farm population, non-farm population and rural population respectively. For administering the act, \$100,000 was authorized annually. Also an appropriation of \$84,603 was authorized to bring the allotments of each state in each of the three fields up to a minimum of \$5,000.

With the realization of the expiration of the George-Ellzey Act, a group of Southern leaders in agricultural education met in Atlanta early in 1935 to discuss the emergency of the Southern states. Out of this meeting grew a national, rather than a sectional, statement asking for more emergency funds from the Federal Government. This statement was given to the American Vocational Association which drafted a proposed bill to take the place of the George-Ellzey Act.

On May 1935, Senator George of Georgia introduced the bill but no report of the Senate committee was made in the first session of Congress. In the second session, Congressman Deen of Ga., introduced in the House a bill identical with the George bill. After much revision of the George bill, it was substituted for the Deen bill and the bill was passed that year.

This bill supplemented the Smith-Hughes appropriations of \$7,302,000 with \$14,483,000 making a total appropriation for States and Territories of \$21,785,000. It also authorized \$350,000 for administration of the Act.

The George-Deen Act differed from the Smith-Hughes bill in several other respects. This bill recognized one new field of vocational training, that of distributive occupations and another field, public service occupations, received somewhat indirect recognition. Another change was that this bill carried an explicit-negative provision prohibiting use of funds for training programs in industrial plants unless they provided bona fide vocational training. Other changes in the methods

of allotments were: the States had to match only 50 percent of the Federal money until the year of 1942 and 10 per cent more each year thereafter until the State matches dollar for dollar; the minimum allotment to States was raised to \$20,000 for each trades and industries, home economics, and vocational agricultural education, and \$10,000 for distributive occupations.

The basis of allotting the appropriations of this bill for vocational agricultural education, trades and industries, distributive occupations, home economics, and teacher training was on the population basis, farm, non-farm, total, rural, and total respectively.

Now after twenty-one years since the Federal Government first made appropriation for vocational education in our secondary schools, we have a total of 1,810,150 boys and girls taking some form of Vocational training. This number is approximately only half of the students that should be reached, but considering that this is a new form of education; that the public had to be convinced that vocational education is as important, if not more so, in our education curriculum as the education of the literary phase; and that our funds have been limited, great progress has been made.

Since 1918, the enrollment in vocational education in public schools has grown from 164,183 pupils to 1,810,150 and our appropriations have averaged an increase of \$1,000,000 per year. Will this great work continue to grow? Will the other half of the boys and girls needing vocational training be reached? Will our Federal Government continue to increase our funds when they are needed so that the vocational education staff may carry on its huge task?

The answers to the above questions are not known at present, but all indications go to point that every one of the questions may sometime in the near future be answered in the affirmative. These are the problems that will challenge us, the future vocational teachers and trainers of tomorrow. Will we be equal to them?

THE AGRARIAN

The sweet potatoes which rot in one year in the South would pay for enough curing houses to save the entire potato crop for many years to come.



## SOME ASPECTS OF THE NEW FERTILIZER

### LAW OF SOUTH CAROLINA, PASSED 1939

By K. G. LYTTON, '41

In the spring of 1939 the South Carolina General Assembly passed a new fertilizer law. The important changes introduced by this new law are as follows: (1) the required statement in the order of analysis in available nitrogen, available phosphoric acid, and available potash (N-P-K); (2) Nitrogen is expressed as nitrogen rather than the ammonia equivalent; and (3) a mixed fertilizer must contain a minimum of 16 percent of total plant nutrients; (4) Net weight stated and guaranteed rather than gross weight; (5) and the maximum chlorine content stated on the bag of all goods branded for tobacco.

The statement of expressing the plant nutrients as (N-P-K) is similar to the required statement of all bordering states. This will prevent the farmers near the borders of adjoining states being confused when buying fertilizer.

The new law requires that nitrogen be expressed as nitrogen rather than the ammonia equivalent. Ammonia and nitrogen describe the same plant food element, but the method of expression is somewhat different. One unit of nitrogen is equal to 1.2158 units of ammonia and one unit of ammonia is equal to .82248 units of nitrogen.

The minimum requirement of 16 percent of total plant nutrients will save the farmers of South Carolina over a million dollars annually. During the past twenty years low cost high-analysis materials have been developed, which made it necessary to add large amounts of inert filler, such as sand, in the manufacture of low grade analysis fertilizer, so commonly used by the South Carolina farmer. The advantage of high grade analysis fertilizer not only saves the cost of the filler, but it also saves the handling, bagging, and transportation cost. Some fertilizer companies have adopted the practices of adding limestone as a filler in the low analysis goods, but this is a very expensive method of applying lime.

The net weight stated and guaranteed rather than gross weight is also a saving to the farmer. In this way the farmer will not buy bags instead of fertilizer to the extent of about ten pounds per ton as occurred under the old law.

The maximum chlorine content of all bags of fertilizer branded for tobacco will be of es-

## A SOURCE OF FERTILIZER AND LIMING PRACTICE RECOMMENDATIONS

The soil acidity problem in South Carolina is the limiting factor in a diversified system of agriculture. The fertilizers used in the past have been of an acid nature which has increased this deficiency in some areas to a critical point.

The farmers of South Carolina have been paying out one million dollars annually for inert sand materials. Some fertilizer companies have been following the practice of adding limestone as a filler for their fertilizer, but this is a very expensive method of liming the soil. Why not divert this million dollar expenditure into much needed lime materials and make it possible to have a more diversified live-at-home system of agriculture. There is needed annually about one half million tons of lime materials on the soils of this state. This addition to the soil would increase the yields by making the soil better physically as well as increasing the availability of the plant foods.

The "Fertilizer and Liming Practices Recommended for South Carolina, Circular 60" written by Dr. H. P. Cooper is an excellent source of information for your soil problems. Some of the information included is lime recommendations for various crops, pH range for the growth of common crop plants, suggested time to apply lime, and various discussions on liming programs.

pecial interest to all tobacco growers. This will be an aid to the farmer in selecting his tobacco fertilizer.

The short-comings of our old fertilizer law was not due to the practices of the fertilizer manufacturers, but more to the demand of the consumer for low grade analysis goods. Since the old fertilizer was not in keeping with the modern scientific developments in the manufacturer and use of commercial fertilizer, the new law was designed to aid the manufacturer as well as the consumer.

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Vol. 3



No. 1

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# Terracing for Soil and Water Conservation

By A. F. BURGESS, '41

. . . "Champion of conservation, terracing leads the fight to save soil and water" . . . . .

It is estimated that erosion removes not less than 126,000,000,000 pounds of plant-food material from the fields and pastures of the United States every year. This is more than 21 times the amount removed by crops. The annual financial loss amounts to about \$200,000,000.

Since Colonial days American farmers have built various hillside ditches to conserve the soil on cultivated fields. Terraces are almost as old as agriculture itself. In the United States hillside ditches and furrows were the fore-runners of the present-day terraces. Later farmers in the South began to use ditches and furrows across the slopes of their fields to intercept run-off and erosion. Before the introduction of the wide-base terrace the narrow-ridge terrace had been used. These narrow-ridge terraces could not be cultivated and were allowed to grow to grasses and briars. Although the old-type hillside ditches or terraces failed frequently they were sufficiently successful to induce farmers to continue their use year after year.

Later, a wide-base terrace was introduced so that tillage operations could be conducted over the entire terrace. A modification of this type of terrace is widely used today.

Early in the twentieth century, investigations of the use of terraces to combat soil erosion were



begun. In 1929 Congress appropriated an initial sum for the establishment of Federal experimental erosion farms in cooperation with the States. They are located in regions representing wide differences in soil, climate, and farming practices. An important phase of the work on these farms is the experimental study of the capacity of terraces, their effectiveness, design, spacing, construction, and maintenance, and their relation to soils and cropping practices and to the operation of machinery.

Erosion injures fertile lands in a number of ways. The upper and most fertile parts of the soil are washed away until the land becomes barren and unproductive. Deep gullies are formed which means an actual loss of cultivated land.

Erosion is chiefly caused by the direct action of heavy rains beating upon the ground; by the rapid movement of the rain water down the slopes of the land surface, and by the combined action of the freezing and thawing of saturated soil, followed by heavy rains. The steeper the slope the greater is the erosive action of running water.

Often the upper soil is washed away over wide areas when the water is fairly uniformly distributed over the surface; this form of erosion is known as sheet erosion. Where channels are washed down the slopes and by the concentration of large volumes of water gullying occurs. This

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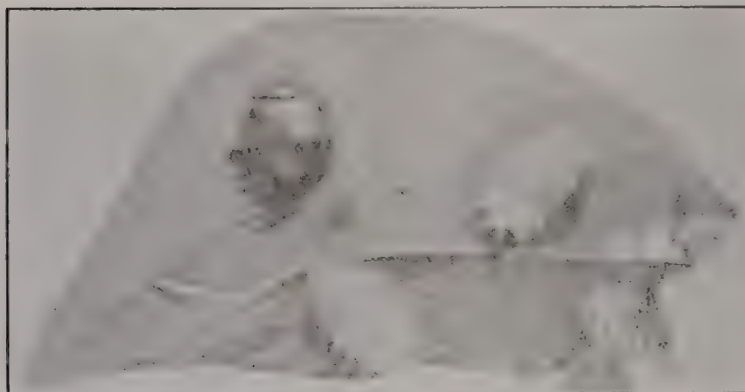




# The Entomologist and the Live-at-Home Program

By F. K. HINNANT, '41

*"Important is the work of the entomologist—research, education, experimentation"*



Everyday, more and more farmers throughout South Carolina are realizing the need for less specialization; are turning to the "live at home" farm program, a policy which calls for a wider diversification of farm crops and practices is rapidly being pushed into the background. Changed conditions due to factors such as foreign situations, increase in efficiency in manufacturing and distribution have lowered the purchasing power of the South's cash crops and brought on this need of a live at home policy. A pound of cotton right now will buy less than  $\frac{2}{3}$  as much of the things farmers buy as a pound bought in 1913, yet the cost of production is the same on the average.

Farmers, through experience and the educational facilities provided by the extension service of the State Department of Agriculture in conjunction with the U. S. Department of Agriculture, are fast realizing that the diversification of crops and farm practices provide a cheaper and higher standard of living than the specialization policy; that the major necessities can be produced at home and the cash crop raised can be utilized in other ways with a greater saving.

The entomologist plays a vital part in this picture. He is needed more in the "live at home" program than ever before. Crop failures due to insects would be just as disastrous to the "live at home" farmer as they would to the specialist. The farmer practicing diversification also has more problems to combat as he has more different crops to attract many more different insect

pests. Then by the old geometric axiom the entomologist has not just one or two problems but many. He can no longer sit at a desk and send out information on the control of the comparatively few insect problems the specialist farmer presented. He is needed here, there, and everywhere at once with one single insect presenting different control problems in different parts of the state.

Contrary to thought, a control for a single insect may not be the same in every area inhabited by that insect. There are many factors which influence this and these factors are not the same everywhere. Presence of other insects, other host plants, type of soil, seasonal variations as applied to planting and harvesting dates as well as insect's life cycle all play a major role in the elucidation of the control problem. After all of this is taken into consideration and the control found, it must be practical, economical, and effective.

To expound further on this situation let us use the cotton boll weevil for example. Dusting with calcium arsenate is not advocated as a control on the sandy soils of the coastal plain where as this is perfectly permissible in the piedmont region.

Then suppose the cotton farmer wanted to change to the "live at home" program; planting alfalfa, or other forage crops; having a small orchard, a garden, poultry, and livestock besides his usual cash crops. Making a conservative estimate, there may be as many as four insect pests on the alfalfa, as many as three insect pests on an average for each garden crop, four pests in the orchard and several on each type of livestock and poultry. This would add up to approximately twenty-five or more insect pests that the "live at home" farmer would have to match wits with if the entomologist were not near at hand.

With the "live at home" program the entomologist is also confronted with the problem of increased costs of insecticides. Whereas the specialist with large acreage and few pests buys

continued on page 30

# Southern Plantations Today

By E. P. HUGUENIN, '41

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*"Capital versus labor, tenant versus planter. Today's plantations are striking examples of 1940's economic war."*

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Cotton is still King in the South, and the cotton plantation remains one of the dominant farm organizations. Although the typical plantations that flourished before the Civil War have changed, this change was more outward than inward. The same characteristics exist: large-scale ownership of the land and the tools of production; concentration upon cash crops; supervision by the landowner; and cultivation by an all too plentiful source of cheap labor.

Cotton is raised today on a large scale in the same areas of the South that produced the larger part of this nation's cotton before the Civil War. A large part of this old plantation land is now operated by tenant farmers and sharecroppers. The astounding increase in tenancy, especially white tenancy, is one of the most striking trends in the agricultural field in the last half-century. In 1860 the vast majority of white agricultural workers were owners, in 1930 more than three-quarters of a million white families in the old Southeast had become members of the tenant and laborer class, a group that is heavily populated without this added hardship.

The plantation is an important factor in the social and community life in the South. Just as the more wealthy urban inhabitants set the pace, so do the large plantation owners. It is only natural that they should be very influential in the community life through the prestige of large-scale ownership. In true plantation areas, land ownership is highly concentrated, and the proportion of tenants among operators is high. Income in such areas is greater than in other Southern agricultural communities, but much lower than in other sections of the nation that don't concentrate on cotton so extensively.

A common argument against attempting to improve conditions among tenants and sharecroppers is that these people are incapable of bettering themselves or of taking advantage of outside aid. Careful observation indicates that

much of their backwardness is due to lack of opportunity. The families are usually large and schools are relatively poor, especially the schools for Negroes. Health services are inadequate to a marked degree. Diet among these families is far below standards accepted as adequate, even for emergency subsistence. The three M's—molasses, meal, meat—constitute the major portion of the diet. An astoundingly large number don't even have a garden, or a cow.

This pattern, this almost complete reliance upon a single cash crop for the years' income, has made the plantations abject subjects of King Cotton. When their Lord and Master is in good health, they attain the pinnacle of prosperity, but when he suffers a slump the depths of despair are reached. With all this, cotton will remain the principal crop in these areas for years and years to come, simply because it is best suited by reason of climate, and location to its production. The old days of controlling labor, under a one-crop economy, are gone, but the system of tenancy perpetuates many of the evils of the old system and none of its virtues. It is true that it works for the plantation operators but it's at the expense of the poor tenant and laborer. The operator must accept great responsibility if the labor of these groups is to be made profitable. With all this he must have skill, energy, and a knowledge of cotton farming; he must be able to plan and assign the crop acreage to the best advantage, handle financial matters, manage his labor force and stock, and supervise advances for subsistence. Usually the operator is expected to look after the social and community affairs of his tenants. On the large plantations he is assisted by managers, overseers, and gang bosses, but on the smaller plantation he does all this himself.

Operators, bankers, merchants, tenants, croppers, and laborers alike are affected by the plantation system. Because they are all dependent upon a cash crop which has a fluctuating market, their incomes are bound to be highly unstable.



# Some Reflections on the Present Crisis

## GUEST EDITORIAL

By Dr. B. O. WILLIAMS

Former Professor of Agricultural Education and Rural Sociology at Clemson College,  
now head of the Department of Rural Sociology at the University of Georgia

When one observes the things going on in the world today, he can only wonder what will come out of the debacle. We are passing through a major world catastrophe. The American people are girding themselves for whatever part they will have to play. The least the country may be expected to do is to stand firm and be ready and prepared to repel invasion and to defend its way of life.

It would hardly be possible to sit down to write or to think at the present time without first weighing the possibilities that lie ahead. In a crisis, people inevitably think of their own survival. Recognizing this, the people of America are making themselves ready, not for aggressive combat or assault, but for protection; as when a mother bird protects her young against the storm, or against intruders that threaten the home nest.

During the World War there appeared several editorials in *The Chronicle*, a literary magazine formerly published at Clemson, dealing with the war situation and with the participation of Clemson men who were leaving by the scores for the army. One of these editorials, entitled "Answering the Call", closed with the following: "Our greatest desire is that they may help win this war and return to their fatherland where they may live in peace and happiness and enjoy the fruits thereof, for 'peace hath her victories, no less renowned than war.'"

We felt that that war was a war to end war. Not so, however, for the monster has reared its ugly head again. The world is effervescing with the same toxins that poisoned the good will of the world and set off the embers of hate a quarter of a century ago. We must now, as then, turn



to future hopes for world peace and serenity.

But that war came to its end, if only for a time; and this one, too, will as surely, at some time and in some way, reach its Armistice Day. The setting now has many implications. As a people we must re-kindle our patriotism and recognize the dangers confronting us. To that end we must do whatever is necessary to put our National house in first-class order. But, in addition to this, we must have greater vision than we had in the last war; for then we did not anticipate the problems that would come with peace. The crisis must command the major effort of the people for the present. Nothing must be left undone. However, there should be a parallel objective of the preparation for peace running concurrently with defense preparation and national protection.

Following in the wake of the existing emergency there probably will come a series of conditions that may be, to some extent, anticipated in advance. Price inflation is bound to develop, for nothing breeds inflation like inflation. After the crisis there will follow a drop in prices. This will have many and varied effects. Productive capacity that has been geared for war output will be curtailed, and many necessary readjustments in industry will have to be made. Land and property values, which will have risen in the crisis, must inevitably fall to lower levels. Demand for goods utilized in military and naval activities will drop off with the return of soldiers and sailors to private life. Farm lands, brought into use to speed up the growth of food and feed for the army, will not be needed. The debt structure, which will have increased to high proportions, will have to be gradually whittled down. Taxes of necessity will rise, countless problems of a similar nature will be faced.

In the meantime, other problems are developing in this country. The nation is maturing, the birth rate is declining, and the population is growing older. Mechanization and technological methods are infiltrating into agricul-

ture. This is creating great shifts in population and freeing large numbers of farm people for other pursuits, or for unemployment. The old frontiers of free lands and of industrial advancement have been either exhausted or are slowing down in their demand for labor. The net effect of all this is to create new problems that will have to be faced after the present crisis is over. For South Carolina, if we are to act with intelligence and efficiency, the preparations must take two main courses.

The first of these has to do with the state's youth problem. Since approximately one-half of the total population of the state is under twenty years of age, and consequently within the broad range of school age, the people have a tremendous responsibility to provide a sound, efficient, and utilitarian program of education.

Of every 100 white children entering the first grade in the state's public schools, it has been estimated that 60 drop out by the end of the seventh grade; 80 drop out by the end of high school; 93 stop between high school and the time for entering college; and 97 have dropped out before the end of a four-year college term.

Perhaps 90 percent of the total time lived by the pupils after finishing school will be spent in two ways—as a member of a family, or as a member of some occupational group. Also it is probably true that three-fourths of the children of South Carolina will spend their lives within a radius of 25 miles of where they now live. This means that they will live, broadly speaking, in their present communities.

Under these circumstances, the masses of children must be reached down in the grades. Their training must acquaint them with the essential elements that will be needed in their future lives; namely, with the problems of their communities, with the place, importance and problems of family life, and with the nature of the occupations that are available to them.

In the second place, about two-thirds of the farmers of South Carolina are tenants, and a large proportion of these farmers do not grow their living on the home farm. Approximately 46 percent of the tenant farmers in 1935 had been living on the farm they were then living on for less than one year. This means a high rate of shifting from farm to farm by the tenant farmers. Perhaps from one-fourth to one-third of them change farms every year.

The soils of the state need lime. A livestock

program cannot be achieved until the acidity of the soils is corrected and until the excessive mobility of farm tenants is checked. Fortunately liming of the soils to correct the acidity may be done cheaply and it is a pre-requisite to growing the grasses, hays, legumes and grains that are essential for livestock production and for the prevention of soil erosion.

Not only for the long pull, but for the sake of national defense during the emergency as well, it is both essential and urgently necessary that our farmers get on a live at home basis. They should grow their chickens and eggs, their milk and butter, pork, vegetables and fruits on the home farm. If all our farmers could be persuaded actually to do this, it would mean a great contribution to national defense and to state defense. **But, above all, it would mean the defense of our farm families against the vicissitudes that will come when the crisis is over and our people are called upon to make the re-adjustments to the factors mentioned above.** A people who are educating their children for life's problems, and who are producing their living at home, will be a toughened people and they will be prepared to meet the demands of the most difficult situations. A state in which this kind of people live will be a strong state, a durable state, and a great state.

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# Electric Fences

By J. C. P. AGNEW, '41

Of all the new electrical farm equipment that has come on the market during the last few years, nothing has been received by dairymen and farmers with as much enthusiasm as the electric fence. The actual construction cost of electric fences compared to various types of other fences indicates a saving of approximately 80 percent. Until the present, fencing has not been an easy job. The time often required for building temporary fences when following improved farm practices has not been available during the summer days when other farm work required attention. Very little time is required to build an electric fence, so this type of fence is used mostly where one wishes to build a temporary enclosure.

An electric fence is a barrier to animals or fowls, consisting of an electrified conductor and an energizing and controlling device. An electrified conductor may be wire, ribbon, tape, rod, tube, plate, mesh, or any other form suitable for its purpose, but may be referred to simply as the fence wire. The energizing and controlling device is the device by which the fence is electrified and may be referred to as simply the controller. A battery controller is one for which the power source is a battery or batteries limited to less than fifteen volts. An alternating current controller is one for which the power source is alternating current at voltages normally supplied by electricity distributing agencies. A converter is any device used to allow a battery type controller to be supplied from an alternation current source or from a direct current source of fifteen volts or more.

The general sources from which controllers may receive their energy are 110-volt power lines, either dry or wet cell 6-volt batteries, or 32-volt farm plants. The 6-volt type has the advantage of being easily portable and may be located wherever convenient or where other electricity is unavailable. It is also safer because of the low voltage source of current. No data is available as to the life of dry or wet cell batteries when used as a source of current for the electric fence. The electric current consumed by fence controllers averages from five to ten watts per hour, or around four to eight kilowatt-

hours per month. The cost ranges from ten to twenty-five cents per month.

There are approximately forty thousand electric fence units in operation. The electric fence as ordinarily used consists of a single wire supported on posts or stakes which are about fifty feet apart. Barbed wire is preferred and its use is recommended over that of other kinds of wire. The barbs penetrate the hair and thick hides of animals that contact the wire. When the animal contacts the barbed wire, greater shocking effect is felt by the animal. There are many different kinds of posts that can be used. Probably the best kind to use is a small wooden post that can be driven into and taken out of the soil quickly and conveniently. The wire is fastened to the posts by porcelain insulators, and in some cases rubber insulators are used when properly fixed.

The areas in which most use has been made of the electric fence are in Wisconsin and Oklahoma, because of the activity of the manufacturing and electric companies in those states. However, use has been found for this equipment in most parts of the country. The most important use of this kind of fence is as a temporary fence. In many cases farmers wish to hog down their crops. This type of fence readily finds its place when used for this and similar purposes. Several electric companies have shied away from it because the state safety commissions are at a variance as to the safety of using it. Some commissions approve no electric fence controllers, some approve the battery units, and others have approved certain controllers of all types after exhaustive testing. Some states require the posting of signs where there is an electric fence.

A few home-made units have been used with success which operate only from storage batteries or dry cells. The home-made fences are usually unsafe and are costly in the long run, because they are not dependable.

It is important that the animals be properly trained. It is not the wire that holds the animals; it is the respect that the animals have for the electrical shock which keeps them where they belong. The training should be done in a

continued on page 28

# Field Selection of Seed Corn

By T. E. GARRISON, '42

Field selection of seed corn is profitable because the seed having a higher germination percentage will make a larger and better yield. It insures reliable, adapted, and disease-free seed. By experiment it has been known to improve the yield of corn four or five bushels per acre. Field selection is a practical and simple method of increasing yield and improving the quality of corn.

The best time to select seed corn is as soon as the majority of the ears are matured and before the first killing frost. Seed should be selected from plants that have green stalks and yellow husks. In early selection we can avoid the diseased ears, and many of the injuries caused by mold which develop on the ears in the field after maturity. If seed are selected after husking time we do not know whether the ears matured early or late.

The strain of corn that has shown uniformity of growth and maturity of plants in the field is the type of corn that we want for seed. Under normal field and weather conditions the stalks should be about the same height, ears should be at a fairly uniform height on the stalks and there should be few broken or prematurely ripened stalks. If the corn is badly broken down, it is an indication that the strain of the corn is unadapted, diseased, or that the soil lacks fertility. The parent plant represents about half of the percentage of all the kernels; therefore, it is habit of growth, health, and vigor that are vitally important. The parent plant should be an erect, strong stalk, and have a healthy root system. It should be free from diseases, vigorous and healthy. Ears selected should be borne at a convenient height for husking. There is a close correlation between height and time of maturity. Ears high on the stalk mature later than those low on the stalk.

The physical appearance of the ear is the final test of determining whether the ear is to be used for seed. The stalk may seem to be the best in the field but the ear may have certain physical defects rendering it useless for seed. The following factors should be considered when selecting ears: (1) condition of the shank (2) the size of the ear (3) maturity of the ear. The shank should hang down when mature but it

should not be broken down next to the stalk. The shank should not be shredded or discolored by infection.

The size of the ear will depend upon the fertility of the soil, the length of season, and the normal size of the variety. The ears should be sound and well filled out, and all the kernels should be uniform in color, bright, shining, horny and dense.

Two or three times as many seed should be selected as will be used because we must follow for further selection during the germination test, final selection, and grading before planting. The seed should be stored where air can circulate freely among the ears. It is necessary that the corn be thoroughly dry to prevent injury from mold and freezing.

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# Edisto Farms Program

By J. B. GUESS, '41

Edisto Farms was originally a cotton producing farm located at Denmark, S. C. When the boll weevil came in 1919, Mr. Guess started looking for a new income from his farm. He could not decide the best way to market his farm products so he tried raising Hampshire hogs, Hereford cattle, and Guernsey cattle. After a few years he dropped the raising of hogs and beef cattle and continued with his Guernseys.

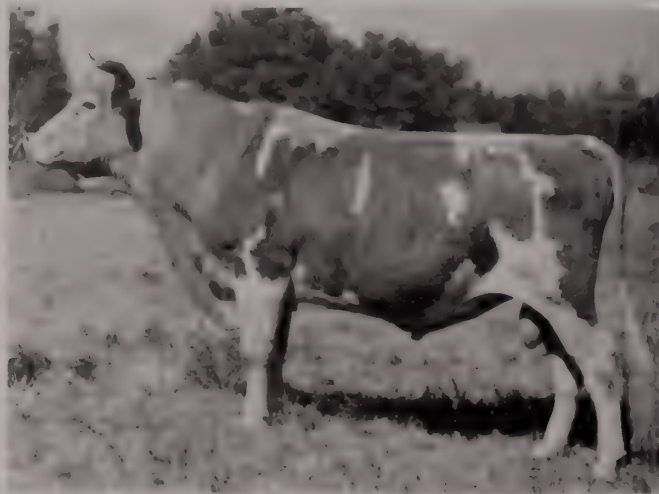
His first registered females were ten pure bred heifers purchased from Mr. M. M. Hollinsworth, of Landeburg, Penn. Mr. Guess's next job was to purchase a bull which would give him production since he was selling milk. Naturally he wanted his cattle to have both type and production but he was more interested in the latter. The bull he decided on was Rose Vista Cyclops who was a son of Glen Gable Girl and a grandson of Langwater Dairymaid. Dairymaid was one of the highest producers with good type of the Guernsey breed at this time. Cyclops started the herd off on the "right" foot by sireing daughters with plenty of size, high production and good type. In a few years Mr. Guess was up against the same problem again. He knew he wanted a bull to follow Cyclops. After writing to some Guernsey breeding friends and studying pedigrees, he decided to get another grandson of Langwater Dairymaid, Florham Jeweller. Jeweller's dam had a higher record than Cyclops' dam and therefore his daughters were bigger producers than, but held about the same type as Cyclops. By

now the herd was steadily growing in size as well as increasing in production. The next bull brought into the herd was Foremost Baron, a son of Langwater Foremost and also a son of Glen Gable Girl. He fitted in very nicely since he was a half brother to Cyclops. Baron improved the type and also helped increase production. His daughters were by far the most desirable up to this time. Their udders were well attached and the teat placement good. Baron only lasted a few years since he was seven years old when purchased. The next bull to come into the herd was Cornelia's Supreme who was out of a daughter of Langwater Foremost and a grandson of Mixer May Royal. Supreme has more producing daughters in the herd than any other bull. They are all high producers with good type. The bull selected to help Supreme was Klondike Kadi. Kadi is another grandson of Langwater Foremost. He is now about seven years old and still in active service in the herd. All of his daughters have very nice type and udders that the Guernsey breed has long been looking for. Two young bulls that are also in active service along with Kadi are Majesty's Babe Ruth who is also a grandson of Mixer May Royal, the same as Supreme. His oldest daughters are about ten months old and are all nice, flashy looking heifers. The other young bull is Edisto Farms Challenger. He is a son of Cornelia's Supreme out of Jeweller's Connie, a daughter of Florham Jeweller.

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Jeweller's Connie 263598



Cornelia's Supreme 162152

# Saddle Horses for Pleasure

By R. C. WIGGINS, '42

"Horses are a large solid-hoofed herbivorous mammal"; they have been domesticated by man since prehistoric time. The horse is used as a beast of burden, as a draft animal, and as a riding animal. Today the saddle horse is used in connection with the pastimes and sports of many nations.

The saddle horse is considered by many people to be the most stylish, beautiful and finished of all horses. Because of the popular standing he enjoys, he is judged by rigid requirements. These are beauty of conformation, attractiveness of form and action, sure-footedness, saddle action and knowledge of gaits.

Beauty of conformation of a horse involves a cameo-like head in sharpness and clean-cutness; consequently a horse has a refined neck, sloping pasterns, shoulders that are moderately high, and neat withers. An ideal saddler will have a head showing a kind disposition and a high degree of intelligence. A "weedy" neck, one that is lacking in muscular development is not desirable. Lots of attention must be given to the slope of pastern and shoulder, for straight pasterns and shoulders are more objectionable in the saddle horse than in any other breed of horses for they tend to make the horse an undesirable rider; height and refinement of withers are essential for the same reason. However, if the horse has flat withers, the saddle cannot be made secure; this being true of the side-saddle. A straight or roached back does not afford an easy ride; nevertheless, there should be a degree of spring without any weakness of swayback structure. The saddle horse is upstanding, and the head and tail is smartly carried. Sure-footedness is vital in a saddle horse. If he isn't surefooted it is dangerous to the rider.

The most highly improved of the world's saddle horses are the English Hunter, the Arab and the American Gaited Saddle horse. The hunter is more of a type rather than a breed.

The Arab and the American saddle horses are the most interesting of the known breeds of saddle horses. The Arabian horse, which is not the most ancient of the Eastern breeds, has exercised a wide influence on the horse-flesh of the world.

A pure-bred Arabian horse has great courage; he possesses the senses of balance and harmony, power and substance, and has elastic and graceful movements. He is gentle, affectionate, and fearless. He has plenty of strength, which enables him to carry heavy riders. He has a great constitution and excellent staying power. While he is not noted for his speed, he can perform long journeys across country with considerable ease, such as those requiring super-endurance. The head of the Arabian horse denotes superior character and intelligence, and the forehead is broad and full with the head tapering toward the nose more than any other breed of horses. The eyes are soft and intelligent; the ears are of silky texture and always pointed inward. In general outline the head is lean and clear cut, which represents high spirit. The neck is of medium length and holds the head gracefully. The shoulders are long and sloping. When the saddle point of view is considered, the shoulders look thick, and the withers look low and broad. His height ranges from 14 to 14.2 hands and he is often classified as a pony. His colors vary from white, gray, bay, chestnut brown but seldom black. The spotted or piebald and yellow colors are never found among the Arabs, though tan and yellow are common among the breed. The Arabian horse is largely limited to sports and show use.

The American Saddle horse breed was largely developed in Virginia, Kentucky, Tennessee, and Missouri, though Canadian horses were used to a small extent. Most of the development was done in Kentucky, and the breed is often called "Kentucky Saddle Horse." The American Saddle horse shows more style in the carriage of the head and arch of neck and tail than any other breed. His courage and spirit, together with his docility give him special usefulness as a sadler. His head is clean cut and somewhat small, with a very slight dish in the face; the eyes are prominent, full and set wide apart; the ears are small, wide apart and very active. The neck is long and gracefully crested with head neatly attached. The shoulders are long and sloping with refined withers; on the other hand, the shoulders are sloping and in coordination with the well

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# Livestock for Permanent Agriculture

By M. I. JENKINS, '41

Intelligent livestock farming is both permanent and profitable for it produces a money making product and at the same time enriches the soil and increases its productivity. Although our soils never can be made as rich as the middle western soils, we can preserve and increase their fertility by the addition of organic matter as farmers in many parts of the world have done. Southern soils are principally deficient in nitrogen, phosphorous, and potassium. Nitrogen is not only the most expensive of these elements but it is required by growing plants in greater quantities than the other elements. Southern soils are also very acid; therefore large amounts of lime should be included in every fertility program. Livestock not only encourages an increase in the fertility of the soil, but it promotes a more advantageous use of the soil. Lowlands that are subject to flooding and hill sides that are too steep for intertilled crops can be most profitably put into pasture.

Grow crops, feed livestock, and return manure to the soil. Would it be cheaper to use fertilizer and green manure crops to increase the productivity of the soil? When food is consumed by an animal part of it is converted into animal products which are sold at a high price, part of it is used for energy and heat, but this part was made from air and water by the action of sunlight on the plant, the rest of the food is excreted as manure. The manure contains over 3/4 of the fertilizer element and 1/2 of the organic matter that was originally in the food. Do not sell feed off the farm. Feed it to animals and let them convert as much of it as they can into high price animal products, and return the unused portion (manure) to the soil to be utilized by another crop. The fertilizer elements that manure contains are responsible for only a part of its value. The organic content of manure is high and this is very beneficial to the soil from a physical standpoint. Many scientists believe that the principal value of manure is due to its content of little known but very beneficial constituents.

The growing of intertilled cash crops not only require the addition of expensive commercial fertilizers, but it also greatly stimulates the



leaching and loss of necessary elements. Pastures and forage crops require comparatively little commercial fertilizers, and the manner in which these crops grow tend to conserve and preserve the nutrient content of the soil. By buying feed, especially feed high in protein, such as cotton seed meal, and by growing legumes for feed it is easily possible to increase the productivity of the soil by taking good care of the manure and adding all of it back to the land. Due to the high nitrogen content of manure produced by feeding large quantities of cottonseed meal it may be profitable to sell grain and buy cottonseed meal for feed.

The South has a good climate and a good market for animal products. Further north the soil is richer and it is easier to build and maintain the nutrient content, but in the south the soil is warmer and more active and the nutrients are more quickly and completely available. The north has few parasites for they are killed by the cold winters, but the warm winters of the south makes it unnecessary to have expensive shelters and the longer growing season is associated with long grazing season and cheaper gains. Great quantities of meat is shipped into the South from the West, meat that could be grown at home. Not enough dairy products or poultry are produced in the South to supply it's own needs. The southern housewife is not educated to buying high price cuts from well finished

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# Effects of Climate on South Carolina Agriculture

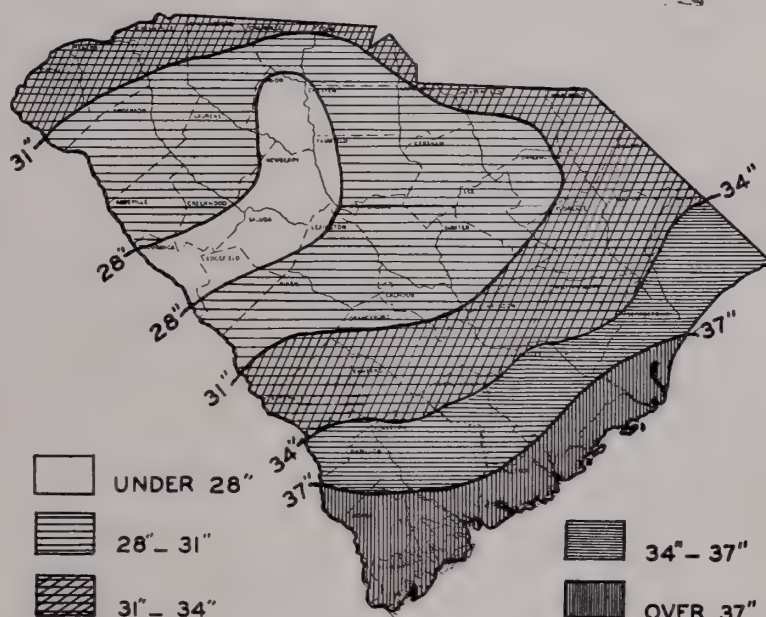
By Z. T. FORD, '41

The climate of South Carolina is characterized by mild winters and long summers with an abundance of rainfall. The growing season throughout the state is long enough for the growth of most field crops. All farmers know that the distribution of the growing season rainfall determines his crop production to a great degree. The weather stations report an average of 48 inches of rainfall per year for a period of 53 years.

Another important consideration is the season of year that the majority of the rainfall occurs. This factor influences the kinds of crops grown in this area. A large percent of the rain in the Piedmont area falls in the winter months with light rains in the summer. In the coastal plain region, the opposite is correct, with most of the rain in the Summer. This fact accounts for the kind of crops grown in each section. The crops suited to the conditions of the piedmont are small grains, cotton, and some corn. The lack of rain in the growing season is the limiting factor in growing corn. The crops suited to the coastal plain region are corn, cotton, tobacco, truck crops, and others. The summer rainfall is necessary to produce these crops on a paying basis.

To get the best results on a farm, a farmer should know the main precipitation of the crop growing season for his section of the state. The figure inclosed gives this information. Additional information may be obtained by getting Bulletin 310, Types of Farming and Farm Business Studies in South Carolina, by J. L. Fulmer.

Under present conditions, the farmer may want to expand to some new crop that he has not been growing. By obtaining reliable information, about the climatic requirements of the crop he will know whether he can successfully plant a fall garden, use his farm to plant truck crops, whether to grow corn, or plant small grains instead. The knowledge obtained in this way may lead to some soils being made very productive, which have made very poor yields in the



past. The county agents and experiment stations are at your service to provide this information.

The abundant rainfall of the state brings up other problems in agriculture. In the piedmont area, the loss of soil or erosion is a major problem. In the coastal plain region, the problem is the necessity of drainage. This water passing through the soil also leaches much of the plant food from the soil. These and many others problems have to be reckoned with individually. Every farmer of South Carolina is urged to make a close study of the climate in his particular locality in order that he may reap the full benefits from his agricultural practices.

THE AGRARIAN

Cotton answered the lure of warm weather in August, forced economists to raise their estimate on the 1940 crop to 12,772,000 bales. Probably 3,000,000 of these will remain in government hands, bringing Federal holdings to a new height, 11,500,000 bales.

A new peanut hull insulation material is said to be almost as efficient as cork and is 35 percent cheaper under mass production methods.



# Introduction to Research

By R. L. STODDARD, '41

The fundamental requirement of a good scientist is research. This holds true whether it be in the field of chemistry, bacteriology, botany, agronomy or any other phase of agriculture. Each year the agricultural colleges of America turn out thousands of "aggies," and the ability of the finished product depends primarily on the individuals background, knowledge, and experience in both the basic and specific courses of his major. If one is not well grounded in these fundamentals he will more than likely fail the crucial test whenever it may occur. Those graduates in any department of agriculture who gets fellowships to institutions of higher learning, civil service jobs, or work in commercial laboratories are invariably handicapped if they have not prepared a satisfactory thesis. Naturally, the schools placing the necessary emphasis on the importance of research turn out the most promising graduates, especially for future scientific work. Regardless of the type of work to be done by a graduate, whether it is personnel, statistical, or experimental work preliminary research is essential.

The Agronomy Department here requires of each student a thesis during his senior year; however, two seniors may work together on some topic of particular interest to them. This work composes not only literary research, filing, and resume work, but also Microscopic and practical experimental work. It is required of each pair of students to choose a subject that is new or has not been explored or completed; that is to conduct an experiment for the purpose of making a new record or collecting new data on the subject.

Most of the time a thesis topic is chosen because of its importance to or of its being a problem of farmers. Also theirs may be the desire to establish a new record on some project or to improve on some disease or insect control. This year the Agronomy seniors have chosen various topics as usual. Those who are interested in the soil direct their efforts toward that type of work. They study some particular characteristic of the soil or factors governing it. This year experiments will be carried out on such problems and subjects as "Work with Salt Water Flooded Soils of Lower Coastal Plains," "The Variation of the P. H. of the Solums of Ten Soil Series in Coastal

Plain," "Lime Requirements of Some South Carolina Soils," and other topics related to soil types and soil surveys made in the state.

Those being more chemically inclined may run tests on the composition of plants grown under specific conditions or choose some title such as "The Ammonia Determination in Nutrient Solutions by the Thymol Hypochromite Method."

The group interested in field crops covers a wider range and generally contains the larger group of interested thesis workers. This group may be placed under three divisions: those interested in plant breeding, those working on field crop diseases, on either the plants or seeds; and those interested in the commercial product.

The field of plant breeding is relatively new and affords many opportunities for young geneticist. In this group one tries out or runs experiments on hybridization or selection and may work on such an experiment as, "The Use of Colchicine on Some Field Crops" to carry out his project.

There being numerous diseases at present to destroy or affect field crops there are quite a number of theses being run on diseases; including "The Treatment of Cotton Seed with Sodium Hypochlorite to Controlling Dampening off in Comparison with Ceresan," "A Determination of the Relative Toxic Effect of Ceresan and Other Fungicides on the Growth of Cotton Seedlings," and "The Variations in Germination of Cotton Seed Collected from Various Sections of South Carolina and the Effect of Ceresan and Sulphuric Acid on this Germination."

The commercial products of field crops vary quite a bit within each crop, being controlled by such factors as climate, seed used, cultivation and availability of plant food nutrients. Topics such as "The Characteristics of Cotton Fibers" are worked on to help solve problems which confront the farmers of our state.

It is by preliminary experiments of this type that one equips himself to fulfill the requirements of his B. S. degree. As a result—the methods used, the routine, and the technique of experimenting leaves an imprint upon the individuals thinking that will be immeasurable to him in the future. Since the individual who shows the most interest and initiative in working on his thesis later becomes the most successful.

# The Good Earth

By H. S. BERRY, '41

We all know that every source of food comes from the earth, but some of us don't know that Fuller's Earth is a commercial source for a bleaching agent.

Using flour mills in the manufacture of earths may seem rather strange, but there are quite a number of plants in this country doing just that. In fact, so important is this unusual use for milling machinery, that the domestic production of Fuller's Earth in the United States has reached an annual value of \$4,333,000.

Fuller's Earth is not just another earth, but has unique properties that render it vital to modern industry, for all mineral and vegetable oils, fats and greases, tallows and waxes, must have some decolorizing treatment before reaching us in their finished states. To accomplish this, no better agent has yet been found than this strange, clayey substance (this hydrous aluminum silicate, with varying quantities of iron, oxide, lime, magnesia, and alkalies) which incorporates a peculiar and apparently unexplainable property of absorbing basic coloring matter

In spite of the fact that Fuller's Earth is of national importance, having been commercially produced in eighteen different states, in general, it has remained clothed in enigma. The reason for this is obvious: production areas are restricted and localized, while its commercial use is closely confined to one major industry, oil refining.

Occasional travelers on seeing modern industrial units which have sprung up "mushroom-like" usually in the most isolated sections, have marveled about it, frequently asking a few questions. Other than this, Fuller's Earth's contribution to our chain of industrial power seems content to remain in a state of oblivion.

But, in the producing areas of Georgia and Florida, Fuller's Earth is real. It is emblematic of progress and prosperity. Through its vast resourcefulness whole towns have been built. Its payrolls have paid for schools and churches. It has added to the prestige of capital and the progress of labor.

The plants themselves are in most completely modernized and operated with the greatest efficiency, practically unanimous in the use of diesel-electric power. The crude clay is dried by means of giant oil-burning cylindrical dryers. The remainder of the process of manufacture is virtually the same as that used in milling flour.

There is nothing very complicated about the processing. It merely involves drying, reduction and separation. The clay is first given a preliminary crushing to reduce it just about egg size. Then, after going through the rolls, it is bolted through a combination of wire cloths and bolting silks, where it is graded according to its various sizes. Standard mesh sizes are 16 to 30, 30 to 60, 60 to 90, and 100 up, although there are certain instances especially ground grades of 200 mesh up.

The average selling price of the finished product is about \$17.00 per ton.

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## BETWEEN THE

### Kappa Alpha Sigma

Kappa Alpha Sigma, the Clemson College Student Chapter of the American Society of Agronomy, recently entertained a group of Anderson College girls at the "Y" cabin. Marshal Walker headed the outing. Bob Stoddard spoke after a steak supper and Dr. G. H. Collings commented on the purpose of the club and its activities. Later, square dancing, the Virginia reel and bingo were enjoyed at the Parish House.

THE AGRARIAN

### With the Grads

E. A. Burgess, soil technologist with the Soil Conservation Service in Anderson, was a recent visitor on the campus.

E. L. Thornton, formerly of Purdue University and one-time state chemist of Indiana, is now agriculturist with Royster's Fertilizer Company.

O. L. Copeland is now working on his doctor's degree at Penn State.

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### 4-H Club

A number of the members of the Clemson 4-H Club took an active part in the 4-H rally held at the State Fair in Columbia, several of them serving on the various committees.

The enrollment this year is a record for the club, fifty-two names being on the roll. G. W. Jones is president, C. M. Eaddy is vice-president and Ben Leonard is secretary-treasurer.

### The Dairy Club

The Clemson Dairy Club, under the leadership of president J. B. Guess, is fast becoming one of the most popular clubs on the campus. At present the club has eighty-eight members. Meetings are held bi-weekly and the programs alternate between club members and outside speakers.

Recent outside speakers have included Professor John Lane, who spoke November twelfth on "Seeking the Truth", and on October eighth, Dr. D. R. Jenkins, Dr. B. O. Williams' successor, made an interesting talk on New Zealand. On October twenty-second, J. B. Guess and E. L. Young discussed their trip to the National Dairy Show at Harrisburg, Pennsylvania.

A cordial invitation is extended to all persons who are interested in dairying and would like to attend the club meetings.

THE AGRARIAN

### The Ag Fair

The Agricultural Fair, sponsored by the various agricultural clubs and fraternities, has been given the approval of college officials and plans are being formulated by a committee composed of the officers of the various organizations with Frank Kearse as chairman.

The fair, to be held in the spring, will have a number of exhibits representing the companies that produce goods which relate to agriculture in South Carolina.

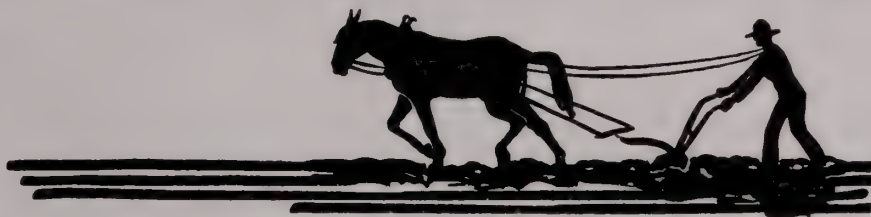
### AGRI-FACTS

A horse may choke on food that dogs can swallow with ease. While a horse eats a lot of food, his stomach capacity is only one tenth that of a cow.

Of 13 major nations only three, England, Belgium, and Australia, have a smaller percentage of their people gainfully employed in Agriculture than the U. S.

Guard fertility. Scientists say that it takes at least 400 years to build one inch of fertile top soil. However, this inch of top soil may be washed or blown away in a few years when cultivated continuously. Rotation and erosion control pays.

In 1934 there was enough money circulating in the U. S. for every man, woman, and child to have \$42.46. How much do we have now?



## FURROWS

### Judging Team Trips

The Clemson Judging Team, which is sponsored by the Animal Husbandry Club, recently returned from a successful trip to Baltimore where the members participated in a judging contest. D. N. Simpson won a blue ribbon for placing first in judging hogs, while M. I. Jenkins placed second in each event. The Clemson team as a whole placed second on judging horses. Professor E. Hauser is coach for the team.

On November twenty-second, the team left for Chicago to take part in the International Cattle Judging Contest. The following men made the trip: J. E. Pace, J. N. Broyles, F. E. Wyndham, R. F. Wheeler, D. N. Simpson and M. I. Jenkins. This trip will take about two weeks.

— THE AGRARIAN —

### Animal Husbandry Club

M. I. Jenkins, president of the Animal Husbandry Club, recently announced that O. H. Shipman won the essay contest sponsored by Swift and Company. Shipman will leave for Chicago early in December.

Mr. Jenkins also said that final initiation of new members took place on November twenty-first. The number of new members is twenty, bringing the total membership to fifty.

— THE AGRARIAN —

### Agricultural Economics Expert

Mr. Dover P. Trent, of the division of State and Local Planning, U. S. Department of Agriculture, recently conferred with members of the extension department on the subject of better relationship between landlord and tenant.

### Alpha Tau Alpha

Three outstanding juniors were recently inducted into Alpha Tau Alpha, the honorary Agricultural Education fraternity. Those boys being initiated were T. E. Garrison, R. L. Bull and J. T. Sherman. They were selected for their scholarship, personal characteristics and leadership ability.

These new members bring the total enrollment to eleven members. C. C. Jackson is president and E. C. Truett is secretary-treasurer of the organization.

— THE AGRARIAN —

### New Prof

Dr. D. R. Jenkins has been added to the staff of the School of Agriculture as Assistant Professor of Rural Sociology. Dr. Jenkins is well-suited to his post and has traveled extensively, having lived in New Zealand.

— THE AGRARIAN —

### Ag. Ed. Seniors to Rocky Bottom

The Winthrop Home Economics seniors and the Clemson Agricultural Education seniors recently enjoyed a week-end social at Rocky Bottom. The students discussed their common problems, made plans for cooperation between agriculture teachers and home economics teachers and then held a campfire program of stunts, games and dancing. Accompanying the students were the State supervisors and the faculties of the Education departments of Winthrop and Clemson.

In Denmark, milk is being sold in sheets. To restore the original liquid state, the dehydrated sheets are dissolved in hot water.

Soil rich in decayed organic matter will hold twice as much moisture as soil in which the humus has been depleted by continuous cropping.

When setting wooden fence posts, mix a gallon or two of lime in the soil before replacing it. This will materially check decay.

It takes about 50 cents worth of rat bait to cover one farmstead. One rat does about \$2 worth of damage a year. Anyway you figure, 50 cents spent for bait is a good investment.

Importance of proper barn ventilation is shown by the fact that one cow, for example, will exhale about 10 pounds of water per day.

The Agricultural History Society is working on plans for a national agricultural museum.



## AGRICULTURE ON THE MARCH

By E. C. TRUETT, '41

As a subject, agriculture embodies a wide range of scientific information which includes contributions from every science now known to man. As an art, it comprises highly developed skill, challenging problems, and complicated manipulative activities which demand the broadest spread of human abilities.

Agriculture is not a fad nor a new "ism" that has recently appeared on the educational horizon. In fact, it is the oldest, the most discussed, and the most fundamental industry that history has evolved. It has always been, probably always will be, the limiting factor in the development of the moral, social, economic, and religious standard of the human race. Let the farmers lay down their hoes for even one season and the wheels of industry would soon stop, the world's culture would break down, our highly-developed civilization would totter and the world would be thrown into confusion. Men would become raving beasts, traditions of art, music, science, and literature would be scattered to the winds. Fortunes would be no more, and the triumphs of science and civilization would fade away as the dew before the morning sun.

It should not be necessary to present any arguments to show why the basic and most fundamental industry of the people in a community should be accorded a place among the subjects for study in the schools of the community. When schools located in agricultural communities fail to provide instruction in agriculture, they fail in one of the fundamental purposes of public school education. When schools were established in the early period of our history, there was little, if any, organized scientific information available in the field of agriculture. The early schools were concerned with so-called three "R's". As additional subjects were added, they were selected for their cultural value (not agricultural). This naturally became the accepted policy and so it has been difficult for vocational subjects to break this rather firmly fixed tradition.

Years of cumulative practical experiences, enriched by results from extensive research in the field of agriculture has made available an abundance of content for courses in agriculture. The response has been a rapid increase in the number of high schools where agriculture is included as a subject for instruction and study.

In the early years, little was known about techniques of teaching vocational subjects. Now,

## SAVING WITH HIGH ANALYSIS FERTILIZERS

By J. M. COTTINGHAM, '42

For a source of nitrogen in the manufacture of fertilizers several decades ago the fertilizer industry used cheap, bulky materials which contained a small amount of plant nutrients in comparison to the total composition. The analysis of mixed fertilizers was therefore low. A demand developed for some of these source materials in livestock feeding and caused their price to rise above that which the fertilizer trade could afford to pay.

The chemists of the world were finding new materials which contained up to 65 percent plant nutrients. The fertilizer manufacturers discovered that it was more economical to use the new synthetic high-analysis materials than to mix the low analysis ones on which the price had risen.

The old standby before the fertilizer laws were changed; 8-3-3, continued to be demanded by farmers because of its former reputation. To supply it the fertilizer companies added about four hundred pounds of sand or other filler per ton to bring the new high analysis materials down to 8-3-3. Of course this process needlessly increased the cost of each unit of plant nutrients. The farmer paid the extra expense of buying the filler, getting it to the fertilizer plant, mixing it with the high analysis materials, bagging the increased volume, and transporting the goods to the farm.

The change in the fertilizer laws of the state helped to bring about increased use of high analysis fertilizers. The farmer can make a great saving by applying these high analysis helped to bring about increased use of high-tilizers at a lower rate or mixing than to lower analysis on the farm by adding limestone, sand, or dry soil.

increased emphasis is given to the practical application of class room instruction. Through the program of farm practices, the students begin productive work through the special projects and emerge at the end of their years of study with a long-time farm practice program that involves the productive and managerial activities of the entire home farm.

Education in agriculture is not any longer an experiment. Farmers have come to regard it as an investment and the best endowment that they can bestow on their children as safeguards against failure in their future agricultural activities.



# Farm Cooperatives for the South

By J. N. FROWEIN, '42

Have you ever stopped to think, just how many cooperatives there are in the United States? There are over 10,500 Cooperatives and almost half of these are located in the South.

Let us first define a Cooperative and see really just what it is composed of and what its duties should be. A Cooperative is a non-profit organization formed by a group of people for some specific purpose. The Cooperative gin of some farm community is a good example of a Cooperative. The characteristics of the Cooperative gin are similar to those of a gin owned by an individual producer which is used to gin his own cotton exclusively. Some features of the Cooperative gin are: (1) ownership by producer-patrons; (2) control by member-patrons; (3) adequate charges and conservative prices maintained. (4) Capital dividends limited; and (5) patronage dividends distributed.

Cooperation is preeminently a farmer activity. Records show that farmers in America have determined the possibilities and limitations of Cooperative selling and buying and that they have evolved techniques for marketing and purchasing that yield benefits to those who participate.

A vigorous rise in Cooperative purchasing by Georgia farmers has taken place since 1930. In 1939 they spent cooperatively for supplies about \$800,000, twice the amount of cooperatives purchases reported for 1929 by the Bureau of Census. This growth, while not spectacular, was of character that promises a future for supply Cooperatives in the South.

The success of all Cooperatives depends upon three things: (1) Keeping the objective of the farmers in mind, (2) giving the members an opportunity to cooperate, and (3) synchronizing ownership with patronage.

Nothing is new about this large Cooperative movement in Agriculture. Records show that as far back as 1810 Cooperatives were in practice. For more than 80 years, grain has gone to market cooperatively in the United States. America consumes each year many millions of pounds of beef, pork, and lamb which at some stage of its trip from producer to retailer is handled cooperatively. Even the cows of the country, some 7,000,000 strong, are doing their bit for the cooperative movement—and it's no small bit they

contribute. Dairy products associations do a business aggregating \$686,000,000 in a year. This figure represents one third of all cooperative marketing done in the United States annually. Selling eggs and poultry by auction, these Coops have proved effective. Coop gins, once found rarely outside Texas and Oklahoma, are gaining a foothold in other states and are increasing faster than any other form of Cooperative in the South. Serving an estimated 60,000 cotton growers, the Cooperative gins are handling nearly 10 percent of all cotton ginned, and are steadily building up their volume. American wool producers are finding the Cooperative way to be the profitable way to send their wool to market. Credit for stimulating national consumer demand for citrus, through wide-spread advertising, goes largely to Cooperatives with farseeing leadership. Apples, grapes, prunes, peaches, pears, cherries, apricots, olives, figs, plums, and nectarines all go to market cooperatively. So do strawberries, cranberries, blueberries, raspberries and many more. Over the Cooperative highway every year there marches a \$50,000,000 parade of vegetables. "A" for asparagus, "B" for beets, "C" for celery—all the way through the alphabet to "Y" for yams may be found vegetables going to market through Co-ops. Cooperatives handling nuts are numerous. They do an annual business of \$15,800,000.

As long as the farmer raises crops, he must buy supplies such as seed fertilizer and implements. Cooperation was tried and found adaptable to the purchasing of these and many other essentials for farming.

Agriculture in the South looks to Cooperation for many important services. Providing varied services closely related to marketing and purchasing, Cooperatives have conclusively proved their worth in the Agricultural field.

For Christmas Gifts See . . .

• H O K E S L O A N •

M E N ' S W E A R

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# Important Garden and Truck Crop Insects in South Carolina

By B. R. WILSON, '42

**The Asparagus Beetle.** The asparagus beetle that we know in this state is a more or less recent introduction having been found in the late 1920's. It is more prevalent on sandy soil, therefore there is more damage done in the coastal section than in the upper piedmont.

In appearance this beetle is about one fourth of an inch in length and is colored red, black, and yellow. The larva is dark grey and its body is soft and wrinkled.

Both larvae and adults do extensive damage to shoots during cutting time. Crooked shoots are the result of the larva gnawing underground. Later in the season larvae and adults defoliate many plants.

This insect overwinters in trash and rubbish. During cutting time it appears and lays eggs. The time required for the eggs to hatch are three to eight days. After developing by a series of molts for 10-14 days it pupates. The beetle soon emerges from the pupal cell and comes from the ground. There are several broods produced each season.

The best control that has been found is a poison consisting of one part of calcium arsenate and four parts of hydrated lime. It has been recommended leaving occasional shoots to mature and attract the beetle and then spraying thoroughly with the aforementioned poison.

**The Mexican Bean Beetle.** The Mexican bean beetle is the most important bean insect over most of the state. Only a small area in the southern coastal section is yet uninfested. The beetle is present throughout the state and at times damages beans and cowpeas very seriously.

This bean beetle is a lady beetle having sixteen black spots on its yellow to brown wing covers. The larva is a spiny yellow grub.

The larvae and adults feed on the underside of all kinds of table beans and leaves only the vein network.

Adults hibernate in protected places and they first appear on bean plants during April and May, at which time yellowish eggs are laid in large clusters on the leaves. The yellow larva that hatch, feed and pupate on the plants from

which the lemon-colored adults appear. Feeding takes place on the underside of the leaf which makes control difficult.

The best control of this beetle is by insecticides, but it is just as important to destroy crop remnants to prevent further breeding, and to promote vigorous growth so that the leaf area eaten will not be missed by the plant in its fruiting activity.

Research workers of the South Carolina Experiment Station and of the federal government indicate that derris is the most satisfactory material that they have found for the control of this beetle.

When derris is used containing four percent rotenone, one and one-half pounds of the powder is required for a spray to fifty gallons of water. Application of these sprays and dusts should be begun when the beetle is first found in the field. If the beetles are numerous the treatment should be repeated every ten to twelve days.

**The Tomato Fruit Worm.** This worm is highly variable in color and so very well known that it does not require an extended description.

Caterpillars eat into the fruits and cause them to spoil. Climbing cutworms also produce similar injury.

The tomato fruit worm passes the winter in the pupal stage. Adults or moths emerge during late spring and lay eggs on plants such as tobacco, corn, and later in the season, cotton. Several generations are produced each season. This worm is known as the tobacco bud worm, cotton boll worm and cotton earworm.

The worms are restless and shift from one fruit to another so that one worm may damage several fruits. Studies by the Bureau of Entomology show that a single worm may ruin as many as seven fruits.

To date, poisoned Bordeaux has been found to be one of the most effective spray used. A 4-4-40 Bordeaux mixture with one pound of arsenate of lead was sprayed on the plants, beginning when first fruits appeared.

Picking and destroying infested fruits will aid in reducing damage.

**EDISTO FARMS PROGRAM**

continued from page 10

Connie, besides having 884 pounds of fat, is still one of the best type cows in the herd. She is now 16 years old and still bringing a calf each year. There is also a full sister to Challenger, Supreme's Connie of Edisto Farms. She is a big cow with a nice udder, good type, and a record of over 700 pounds of fat.

The herd now contains about 155 females all of which are descendents of some of the foundation animals at Langwater Farm, making most of Mr. Guess's herd line bred. He has been line breeding from the beginning, which is a very good practice as his herd has shown gradual improvement in both type and production. This herd is another case which shows that line breeding is the surest way of improving a herd. Mr. Guess has been doing Advanced Register Testing for about ten years. All of his mature cows have records and the heifers are being tested as they freshen with either their first or second calves. They are now milking about 75 cows and getting around 250 gallons of milk per day. Mr. Guess is putting up a new plant in Columbia, where he is already selling his milk. His business has increased over 100 percent each year that he has been in the city.

Mr. Guess thinks his success as a dairyman comes from line breeding the Guernseys and raising all the feed that they consume on the farm. He plants a large acreage of oats, corn, wheat, and oat and vetch hay. In the fall he also plants at least an acre and a quarter of rye and vetch for each cow to graze. These fields are plowed up in May and planted in corn and soybeans for silage. The oat and vetch hay is usually followed by soybeans planted in rows for grazing. Then, too, he has a large acreage of permanent pastures which contain a sod made up of Bermuda grass, Dallis grass, White Dutch clover, and Lespedeza. The small grains are followed by cowpeas or lespedeza, which is cut for hay. Some cotton is still planted on the farm and the seed made into meal for the cattle. All the feed the cattle eat is produced on the farm except Beet Pulp and 20 percent dairy feed which is fed only to the cows on Advanced Registry Test. Mr. Guess's motto is "Better pastures, cheaper milk", and he always tries to have grazing as near the year 'round as possible.

— THE AGRARIAN —

To be good farmers we must think good farming.

**SADDLE HORSES**

continued from page 11

sprung rib. The quarters are long and the muscles are strong. The feet are of medium size, the hoofs are elastic and the heels spread and well developed. He weighs about 905 to 1,050 pounds. The standard height is 15 to 15 hands, 2 inches. The solid colors, such as bays, blacks, browns and chestnuts are most desirable, although many colors are found.

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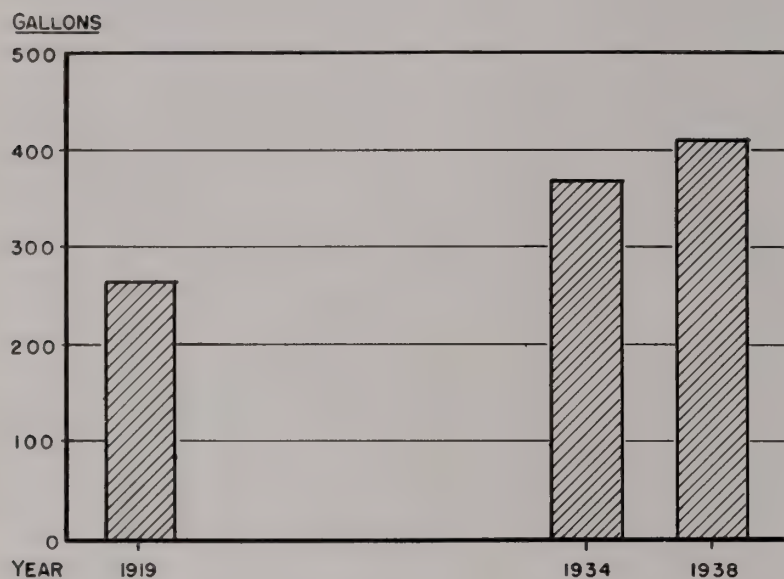
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# Dairy Herd Improvement Association

By W. M. HOBSON, '42



In the nineteenth century such inventions as the Babcock test for determining the percent of butterfat in milk and the development of various feeding standards began to awaken progressive dairy farmers to the fact that all the cows in their herds were not alike. Indeed, cows differ in production, feed consumption, and percent fat in the milk. Dairy men soon saw the need of some method by which they might check individual cows for either profit or loss. Their solution to this need was found in the formation of organizations that subsequently developed into the Dairy Herd Improvement Associations of today. These associations are composed of groups of dairy farmers interested in improving their herds and obtaining more efficient production.

This progressive movement was launched by Emil Konradi, of Denmark, in 1895. Since that time, the work has spread to thirty-four countries where dairying is an important industry. The dairy men around Konradi's home had been shown the value of testing cows. They tried testing their own cows but found it difficult to add this extra work to their routine duties; consequently they discontinued testing cows. A woman suggested that several dairy men employ a man to do nothing but test. Konradi was then hired as the world's first cow tester.

In the United States the first cow-testing association, now known as Dairy Herd Improve-

ment Association, was organized in 1905 in Newago County, Michigan, but did not begin functioning until January 1906. Since then, similar organizations have become active in every state in the United States.

The first association in South Carolina was formed in 1926 by a group of dairymen in the vicinity of Greenville. This association was active, but the work did not become very extensive until 1934, at which time it became a part of the program of the Extension Department of Clemson College. Dairy Herd Improvement work, under the leadership of C. G. Cushman and his associates, has progressed rapidly in South Carolina. There are now five associations testing a total of 3248 cows in 84 different herds.

An association usually is composed of fifteen to twenty dairy farmers who cooperatively employ a trained test supervisor. He is usually a college graduate who is well trained in dairying. The farmers provide room and board for the supervisor during his stay at the farm, and in addition pay him according to the number of cows he tests. There is a minimum fee of four dollars a day for which the supervisor will test twenty cows. Additional cows are tested at the rate of twenty cents per cow.

The supervisor officially visits each farm once a month. He weighs and records the amount of feed each cow consumes and the amount of milk she produces. In order to maintain accurate records, identification of individual cows is necessary. The supervisor accomplishes this by placing a permanent tag in the ear of each cow. From each cow, the supervisor collects a sample of milk at every milking during one day. He composites these samples and tests for butterfat. With the recorded information, the supervisor calculates the profit or loss from each cow.

Immediately after the recording and calculating is completed, the supervisor shows and explains the records to the farmer and advises him as to how he may make his dairy farming more efficient and more profitable. The dairyman may have cows that are not profitable because of their low production, or he may be exercising unprofitable feeding methods. In either case, the records will reveal the trouble and the

supervisor will suggest a remedy. If the farmer remains with an association and follows the advise of the supervisor, he will usually profit greatly. His profit may come from increased production, or it may come from the sale of animals with D. H. I. A. records. An animal with a record will sell more readily and at a higher price than an animal without a record. Not only will his income increase, but also his herd as a whole will improve. He may also prove sires in his herd with the records of the sire's offsprings.

This herd improvement work has been very beneficial to dairying in the United States. It has tended to arouse and stimulate a keener interest in the field of dairy farming.

The above chart (taken from "Extension Work in South Carolina—1939") shows the increase in average production that has been brought about by D. H. I. A. testing in South Carolina. Since 1934 approximately ten percent of the cows placed on test in South Carolina have been culled because of poor production records.

No system in cow-testing is perfect. One fault seen in the Dairy Herd Improvement Association is that usually the dairymen who need aid the most are the ones who do not join an association. Of the twenty five million cows in the United States, only two percent, or five hundred thousand, are being tested.

There has been a slogan in the South "More Good Cows."

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## THE AMERICAN YOUTH FOUNDATION

By ORDWAY STARNES, '42

We at Clemson are glad to have with us one who has been acclaimed the second most outstanding Agriculture College freshman in North America. This title being awarded by his winning The Danforth American Youth Foundation Scholarship, awarded by William H. Danforth of St. Louis, Missouri. The Danforth Scholarship Committee selects one outstanding freshman from each Agriculture College in North America. These freshmen are awarded half scholarships to camp Miniwanca. They, in turn, compete with each other for a full scholarship. The full scholarship was won by Paul L. Kelley of Kansas State College and Edwin B. Collins of Clemson was chosen as his alternate. Due to the illness of Kelly, Collins was able to take advantage of the full scholarship which paid all expenses, including transportation to Camp Miniwana.

Camp Miniwanca is located on the shore of Lake Michigan near Shelby and is conducted from August 12-25 for the purpose of establishing principles and habits in outstanding young American citizens which will lead to a more balanced living, physically, mentally, socially, morally and religiously. Representatives of the Uptown Kiwanis, F. F. A., 4-H and many others important clubs attended this camp.

The basis on which scholarships are awarded are on work done during high school and their first year of College. Physical, mental, moral, and religious qualifications are considered.

We bow to Edwin Collins, not only because it was truly an honor to win the Danforth Scholarship, but because of the excellent work which he is continuing to do at Clemson.

— THE AGRARIAN —

Heavier tobacco taxes will be no aid to 1940's heavy tobacco stocks. Although smaller production is expected to offset the record holdings of flue-cured this year, Federal cigarette taxes have been pushed up again. This winter Uncle Sam gets 81 cents per pound on cigarette tobacco. States with cigarette taxes average 25 cents per pound. Average farm price of flue-cured is less than 22 cents per pound.

— THE AGRARIAN —

In 10 years a single head of wheat added 10 million dollars to the wealth of its home state. Pennsylvania No. 44 variety was developed from one head of wheat discovered at the State College in 1909.



## LIVESTOCK FOR PERMANENT AGRICULTURE

continued from page 12

animals but insists on buying ordinary medium grade meat; the kind that can be most easily produced in the South. The greatest handicap to the expansion of livestock production in this region is cheap labor. All classes of animals respond to good care and are handicapped by poor care. Proper care requires good labor. For these reasons livestock will give rich rewards to good management and intelligent planning.

Study and experience are the best ways to learn how to make a profit with livestock. Become acquainted with all the classes of animals, their virtues and short comings. Study your farm and its location so you can know which is the best type of animal for you to raise. Learn to judge stock, especially meat producers, so you can pick out the good from the inferior. A record of production is more important with dairy cattle than judging. No where can the principal of "make haste slowly" be better applied than in the production of livestock. A man who does not know what he is doing will not stay in the business long, but a little patience will go a long way toward teaching him many of the things he needs to know. There are several principals that no farmer, especially stockmen, can afford to forget. Farm as economically as possible. Pastures are absolutely essential for beef production. Mild winters with year round grazing is Argentina's chief advantage and it is a wonderful pasture country. Southern pastures, and South Carolina are no exception both need liberal applications of lime and superphosphate. Permanent pasture has become the backbone of southern livestock production. Naturally the better the pasture the more economical will be the gains of the animals and the greater the returns from the enterprise. But cattle and sheep will give surprisingly good results even on the poorest land provided enough acreage is supplied per animal. One can not expect animals to get fat on poor pasture, but they will grow and maintain themselves if they are not too old. It will pay any man to make his pasture as productive as possible. Permanent pasture gains are cheap gains and the southern producer is fortunate in having a market that will consume large quantities of the type of animals that can be produced on pasture. If you have limited acreage of rich soil it may pay best to go into the more intensive forms of pro-

## AGRI-FACTS

By E. C. TRUETT

There are about three chickens on farms for each person in the United States.

In order to produce full size apples the ratio of leaves to apples must be about 40 to 1.

From the bottom of the Depression, grains have made the greatest gains in price.

Whey—a by product of cheese factories, is the basis for a new shaving cream.

Broiled humming bird's wings would have been about as cheap as the lone peach the Sam Moore family of Sesser, Illinois, ate for breakfast. The peach represented the entire 1940 crop of the Moore's 50 acre peach orchard, which usually produces 10,000 bushels. After \$2,200 was spent this year for spraying, pruning, cultivating and other care, one peach was the crop.

Lasting success in farming is achieved by doing the usual things unusually well.

duction such as dairying, pork production, and fat cattle production. Your location and your individual judgment will have to determine which course you will take. There are many acres in the south that can best be put into permanent pasture because of their location, their productivity, or their topography. Permanent pastures will not only conserve and improve these soils, but will yield a profitable return as well.

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# Cooperative Frozen Food Lockers

By S. F. PHILLIPS, '42

A comparatively new development is attracting widespread attention throughout the entire nation—that of cooperatives. This new service is the frozen food locker system.

The Farm Credit Administration reports that on Jan. 1, 1940 there were between 2,000 and 2,500 locker plants serving approximately 500,000 families throughout the United States. These locker plants are found as private businesses, cooperatives, and as sideline enterprises of both cooperatives and private concerns. It is estimated that about 15 percent of the total number of plants operating in the United States are cooperatively owned. This development has been most rapid in small towns, and the majority of the patrons have been the farm families and other rural people who live in and around these centers.

There are a few factors which might serve to explain the enthusiastic acceptance of the locker method of preserving the family food supply. The greatest factor is that proper freezing provides more palatable food and eliminates the old drudgery of canning. Furthermore, it is cheaper when compared with retail purchases of meat at the up-town butcher, and in many cases it provides a higher quality meat.

However, in some instances it is inconvenient to have the food supply stored at some distance from the home. This may limit the use of the locker system in more sparsely settled areas, while the cost may be the limiting factor in areas where the farm income is low. The latter condition offers a challenge to cooperatives, for it is in these areas that cost and charges should be kept at a minimum.

Before going further, let us consider a few advantages and disadvantages of the locker system. Some of the factors which appeal to farmers are:

1. Locker storage permits the farmer to butcher at any season of the year, since immediate cooling under controlled temperatures is possible.

2. There is less spoilage under controlled temperatures than on the farm.

3. The locker plants usually employ an experienced meat cutter; hence you get better

utilization of the carcass.

4. The quality of cured and smoked meats by an expert butcher usually is superior to that of farm-cured meats.

5. A more balanced diet is possible through the storage of meats during seasons when it is impossible to keep it on the farm.

Advantages of a cooperatively owned locker plant: A cooperative should be more able to plan and build a plant to fit the need and desires of the community with less fear of competition which may result in a high operating cost. Cooperatives are in a better position to teach farmers the possibilities and uses of the locker service. The member patrons take a greater interest in the problems and management of the plant since they are part owners of the concern.

Some disadvantages of the locker plant are:

1. The necessity of making a trip to the locker every three or four days for meat or other food products stored in it. This is even more true where the patron does not find it necessary to make a trip to town once or twice a week on other business matters.

2. Meat must be used very soon after being taken from the locker. Many farmers renting lockers have a small unit installed in the home to hold several days' food supply.

3. Lack of wide variety of meat products as when purchased are secured from the up-town butcher.

The real need for a locker plant should be realized by the majority of the farmers in a community or trading center. Once the need has been determined, hold several local meetings to explain the possibilities and limitations of the service to be rendered by the cooperative. A committee of 7 or 9 individuals is elected to start a membership drive. It is necessary to estimate the potential patronage in order to form a basis for the size and location of the plant.

Survey the town or community for a possible building site. The plant should not be located too far from the trading center, but should be located so as to provide ample parking space for the patrons. It should have access to sewer, water, and electric connections.

continued on page 32



# Year-Round Pasture

By L. C. HAMMOND, '42

Pastures of South Carolina are now receiving much attention as the South is in many ways adapted to livestock production. It has a mild climate, an abundance of rainfall and has soils to which many pasture plants are well adapted. In the early days, the South was the best cattle country in the New World. However, with the invention of the cotton gin and the resulting expansion of cotton growing, cattle grazing was rapidly pushed to other areas.

The production of cotton has brought the Southern farmer to face many problems. It has resulted in the depletion of the soil's fertility and its loss by erosion. Much land on which cotton could no longer be grown profitably has been turned out and because of its low fertility has not produced native plants in great enough abundance to control erosion. It is such sub-marginal land in the South that is fenced and used for pasture. This land should be treated as a sick patient and receive the attention of everyone. Pasture land properly managed offers a direct aid.

Since the South no longer has a foreign market for its cotton there must be some other source of income. Adjustment of supply to demand can be accomplished by returning to pasture land that should never have been cultivated. However, after realizing the need for pastures and the benefit to be derived from their use, we are confronted with this question—can pastures be made to supply grazing for livestock the greater part of the year? We find that it is possible.

To provide pasturage throughout the year, permanent and temporary pastures must be used. Let us first consider the permanent pasture.

A permanent pasture is grazing land seeded with perennial pasture plants or self-seeding annuals, or both, which is not plowed or cultivated over a long period of time. A desirable permanent pasture contains both grasses and legumes. A good pasture mixture recommended for South Carolina consists of Bermuda, Dallas, and Carpet grass and White Dutch Clover, Hop Clover and Lespedeza.

Bermuda grass is a perennial, turf-forming plant of high palatability and is very nutritious.

It grows well alone or in mixtures and can be grazed from late spring to early fall.

Dallas grass is a perennial bunch grass, best adapted to moist bottom land and withstands grazing better in mixtures. It is grazed from early spring to late fall.

Carpet grass is a perennial adapted to the Coastal Plains. It can be grazed from spring to fall but will not withstand severe freezing.

The Clovers and Lespedezas are very advantageous in a pasture mixture. They balance the ration and maintain the nitrogen content of the soil, thus reducing the need of nitrogen fertilizers.

Permanent pastures, if properly managed, will supply adequate grazing from early spring to late fall, except for a period during the summer when there is apt to be a lack of moisture. At this time a temporary pasture must be used.

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In caring for a pasture it must be terraced and contour furrowed to conserve moisture, seed, and fertilizer elements and to prevent erosion of the soil. A pasture is a good recommendation for use in soil conservation.

Also, strict attention must be paid to the low fertility of the average Southern pasture. The basic treatment for a pasture is lime and phosphorous. Apply one ton of lime per acre every four or five years and 300 pounds of superphosphate the first year with 200 pounds per acre the following 3 years. Each year a complete fertilizer of 4-12-4 or 5-10-5 analysis applied at the rate of four to six hundred pounds per acre is generally recommended on poor soils.

Also strict attention must be paid to the grazing of the pasture, as either over or under grazing will materially affect the maximum returns obtained.

The productivity of the permanent pasture will be low during the winter and during the hot, dry season of the summer. At these seasons the temporary pasture is brought into use. A temporary pasture is a field used for grazing when the permanent pasture is unproductive and does not supply the proper amount of food for the animals kept on the farm. Kudzu is a legume well adapted to this purpose. Cowpeas, soybeans, and stubbles from small grains offer pasture during the summer. Velvet beans are well adapted to fall and winter grazing. Barley, oats, wheat, vetch and winter peas can be used for winter grazing.

If such a system of proper management of permanent pastures and their being supplemented with temporary pastures is utilized, grazing can be carried on practically the entire year. Thus, in South Carolina, there is an opportunity for a new source of income, a system of soil conservation and for the maintenance of a diversified system of agriculture.

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## ELECTRIC FENCES

continued from page 8

barnyard where the temptation is not so great as is the case when the pasture fence is near some attractive feed. This training should be done by placing a piece of barbed wire, about twenty or thirty feet in length, across the corner of the barnyard beyond which is placed feed. If the wire is attached to the controller, the animals will be shocked when they contact the energized wire. They soon realize that they get the shock by touching the wire, and after a few attempts to pass the barrier, they become trained. In the case of horses and cattle, usually fifteen minutes to one-half hour is required to complete the training. In the case of hogs and sheep this training period may take some additional time. After being properly trained, the animals may be turned out into the field where they will approach the wire with caution and respect, and will no longer attempt to break out.

THE AGRARIAN

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## TERRACING FOR SOIL & WATER

continued from page 3

type of erosion generally begins in depression or draws. Sheet erosion is not so noticeable as gullying, and for that reason many farmers do not consider it very harmful. However, it is very destructive since it robs the land of the surface soil, which is known to contain a higher percentage of plant food than does the subsoil.

Erosion is caused largely by the rapid movement of rain water over the surface of the ground. Therefore, methods of preventing erosion must be directed toward causing the water either to sink into the soil or to flow slowly over the surface to a draining channel.

Soil erosion may be defined as the loosening and removal of soil from its resting place by the action of water and wind. The two main classes of erosion from the action of water are sheet erosion and gully erosion. Terracing is a valuable prevention of both types of water erosion and, as a conserver of moisture, it directly aids in the control of wind erosion. Terraces form intercepting channels that break long slopes and thereby provide low-velocity surface drainage, which reduces the amount of topsoil that can be carried down the slope or from the field by surface run-off. When placed on the contour, terraces retain much more of the run-off on the field, and so conserve water.

The Mangrum terrace consists of a broad ridge of earth thrown up across the hillside and having a grade in the direction of its length. In throwing up this ridge a broad, shallow channel is formed along its upperside, through which the collected water flows at low velocity to the outlet channels at its ends. The entire terrace is cultivated.

The top of the Mangrum terrace should be from 15 to 24 inches higher than the bottom of the channel on the uphill side of the terrace. The terrace should be built ordinarily from 15 to 30 feet wide at the base, depending upon the slope of the land. Wide terraces are the more desirable from the standpoint of crossing them with farm machinery. The width may be increased each year by throwing the soil to the center of the terrace in plowing until, on moderate slopes, the lower edge of one terrace meets the upper edge of the next terrace below, and the whole field, as often happens, becomes a series of terraces. To prevent washing in the channel, the grade of the terrace should be not greater than 6 inches in 100 feet.

In general, 1,600 to 1,800 feet is the maximum distance that a terrace should drain water in one direction. When a few terraces in a system must exceed the maximum lengths recommended they are handled most satisfactorily by draining the excess length to a convenient natural or vegetated outlet.

The provision of suitable outlets for the removal of surface water at the ends of graded terraces is often the biggest problem in terracing work. Natural water courses make ideal outlets. Sometimes it is found necessary to use a natural drain in a field as a terrace outlet. Where this is done the draw should either be seeded to grass or by some other means prevent the erosion of a deep gully. Mechanically constructed outlets and channels are very simply constructed. They may be made of concrete check dams, check dams of bermuda sod, or planted in kudzu.

The three main requirements of satisfactory terrace cross sections are (1) ample channel capacity; (2) channel and ridge slopes flat enough to permit the operation of farm machinery along the terrace without undue breaking down of the terrace or hindrance to tillage operations; and (3) economic cost of terrace construction. Small blade terracers, scrapers, V-drags, and plows, pulled by farm tractors, horses, or mules have been used for the construction of a large part of the terraces in the United States today.

It is advisable to start controlling erosion on virgin land when it is first broken rather than waiting until the land has become badly eroded and unproductive.

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## THE ENTOMOLOGIST AND THE LIVE-AT-HOME PROGRAM

continued from page 4

insecticides in large quantities at relatively smaller costs, the "live at home" program necessitates buying a large number of insecticides in smaller quantities and therefore relatively higher costs. If this increase in cost is prohibitive for the "live at home" farmer, the entomologist may be forced to devise an entirely new control.

From the insects point of view it might be said that as the entomologist goes, so goes the farmer.

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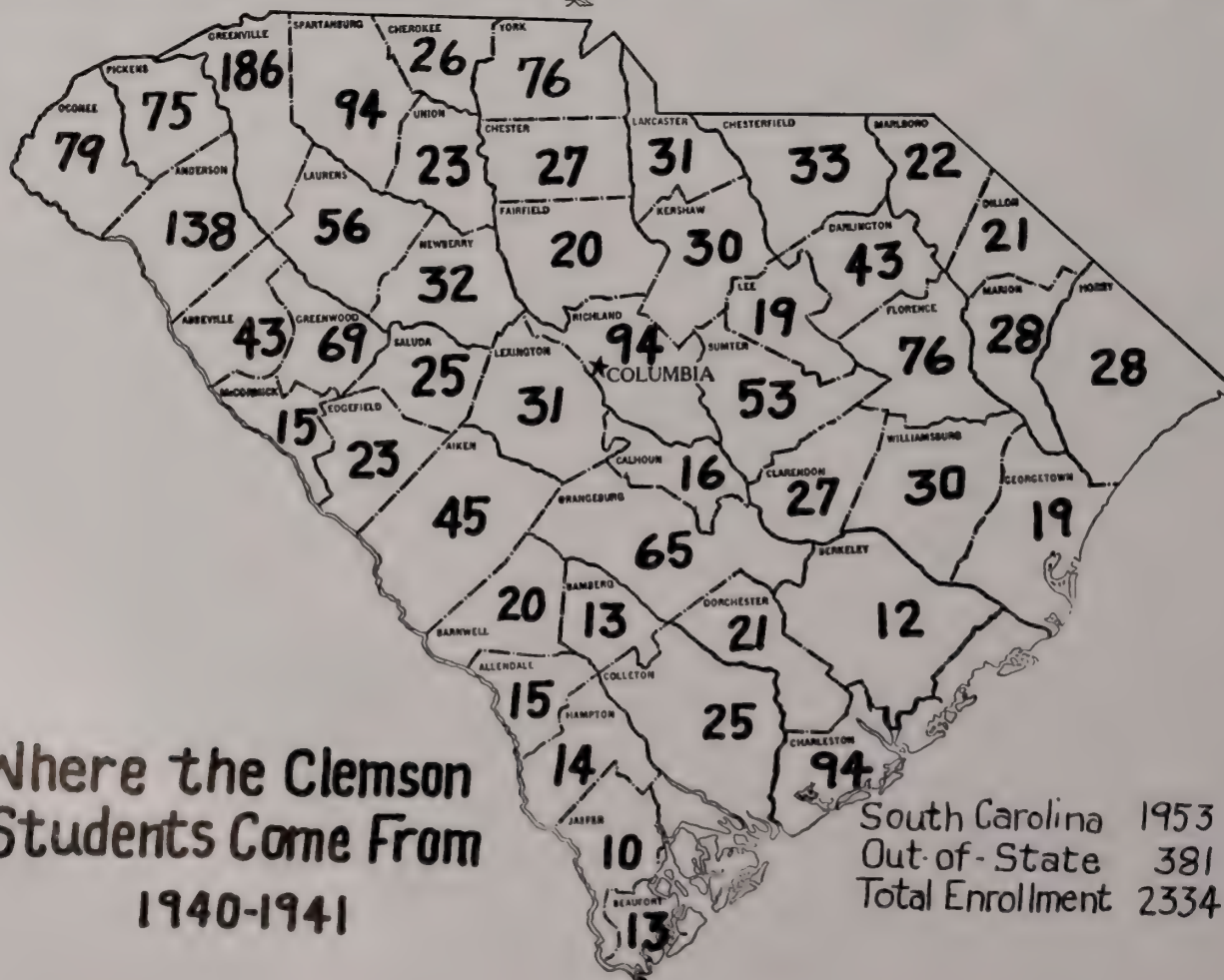
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# A.S.A.E. Industry Seminar Trip for 1940

By T. V. WILSON, '42

Every summer for the past few years several farm machinery companies have jointly sponsored an educational trip for a group of instructors and students from nearly every state college in the United States, and a few representatives from foreign countries. This year the eight following companies participated in bearing the expense of the seminar trip: John Deere Plow Works, Minneapolis-Moline Power Implements Company, Caterpillar Tractor Works, International Harvester Company, J. I. Case and Company, and Alis-Chalmers & Company. This year the seminar group was larger than any group before, and the trip also lasted longer than in preceding years. A total number of one hundred and sixteen men present—one hundred and twelve from the U. S., one from Mexico, one from Canada, and two from Brazil. In order for the group to have more time to spend with each company arrangements were made to do all the travelling at night; thereby, giving a full day for each company.

The trip lasted eight days; one day for each participating company. As a usual thing about half of each day was spent looking through the factories, and the other half was taken up by different factory representatives lecturing on subjects of interest.

The more interesting of the two things mentioned above was the factory inspection trips. To one who has never seen anything like it before, it is really worthwhile to see machine parts made from raw material, processed, and finally combined to make one machine that is frequently capable of doing the work of several men. In the process of making these machine parts, all the factories employ the same general principle; however, in some respects they are different. For instance, some of them have more modern or up-to-date machinery to work with; others seem to have cleaner, better conditions to work under, etc. One thing every company seemed to put special emphasis on was the heat treatment of materials. Nearly every part of every machine has to have some specific quality in order to serve its part on the machine. After selecting the right type of material, it must undergo a certain amount of heat treatment to

give it the quality needed.

Another important phase in making machine parts is the foundry. It is one of the basic departments in making machine parts for the simple reason that without molds and cores in which to pour the melted iron the parts couldn't be made. No factory would be complete without a good foundry.

The assembly line for tractors was the most interesting of all factory departments. It was hardly believable to start at one end of the assembly line with nothing but a frame and walk along as they part by part was added until the tractor was completed, painted, dried, and taken off the assembly line. Three of the factories made track-type tractors. After these tractors were completely assembled, they were fastened securely and run in large pans of oil. The idea for doing this was to break in the tractors.

In all the factories the manual labor of the workers was reduced to a minimum. To move large bulky products from place to place in the same building, large overhead cranes were used. They could be moved in any direction by the operator who sat in a small house in portion on the frame of the crane, also, for moving metallic substances such as scrap iron, large cranes were equipped with a magnet instead of hooks. For hauling small objects in large quantities, small transport trucks were used. They were just flat-body affairs with tractor motors in them. In some of the factories there were small flat body cars that ran on tracks. They were usually pushed by the transport trucks described above. Other labor saving devices were electrical lifting devices and electrically operated wrenches.

Another very amazing thing to watch was the large machines used in making bolts, pistons, connecting rods, crank shafts, and many other things. The operator merely put in the stock and removed the finished product.

After going through these factories one can easily see why the designs of tractors and other machinery are not changed much from year to year. It is nearly impossible because there would be so many complicated machines to rebuild, thus resulting into a big loss of time and money.

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## COOPERATIVE FROZEN FOOD LOCKERS

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Select or elect a committee to visit and examine several plants which are operating successfully. This committee should gather information on building costs, operating costs, upkeep, and the methods of serving patrons.

Estimate the complete costs of the plant, the amount of money which can be borrowed from a cooperative bank, and hence the amount which it will be necessary to secure from stockholders. From 40 to 60 percent of the amount needed for building should be collected from stockholders.

Plant arrangement of the proposed building should be given thorough consideration. Plan for future expansion rather than overbuild in the beginning. Install good insulation. Skimping on insulation is false economy, but remember that a high price does not necessarily mean a good installation. Provide the type of floors and facilities that can be cleaned easily and thoroughly. So arrange the processing machinery to avoid "back tracking" in handling meats.

These foregoing points should be kept in mind in building a locker plant.

A frozen food locker plant, properly built and operated may do much toward improving the diet of farm families. Cooperatives will render a real service to farmers generally if they are in a position to set a pace in this new and fast growing development.

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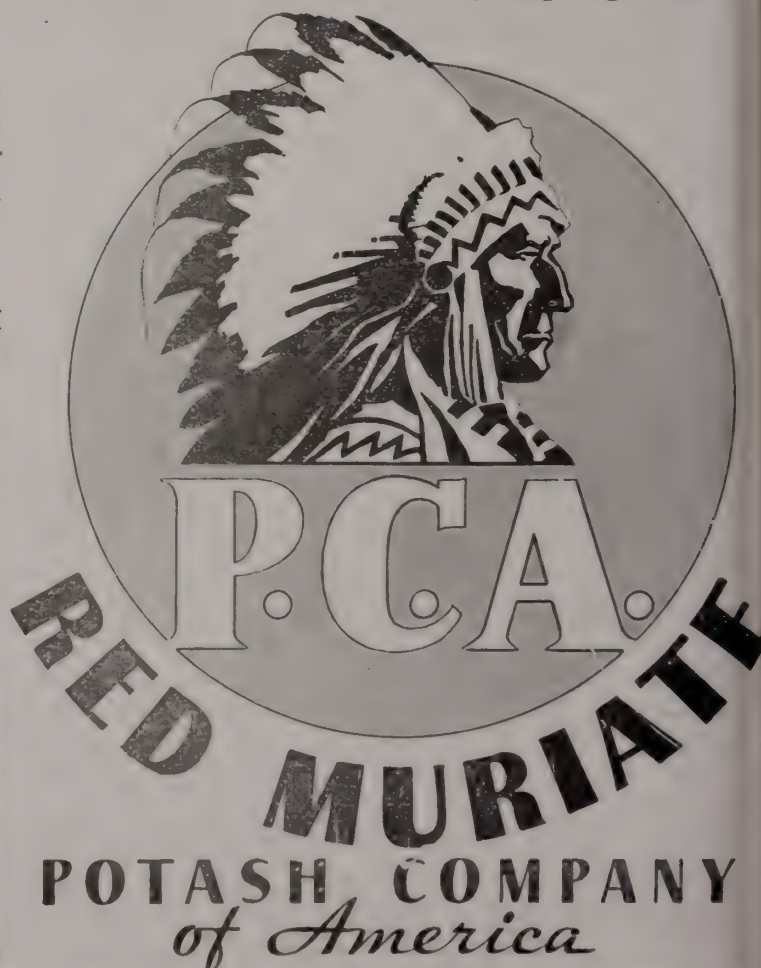
## A.S.A.E. INDUSTRY SEMINAR TRIP FOR 1940

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It would also cut down on the production which would result in another loss, because they can hardly produce enough machinery now to meet the farmers demand.

Another thing that is very important in any factory is an organization of workers. In most of the factories we visited the workers had some type of organization. They held regular meetings and discussed things they thought would help them in their daily work. All of them also had athletic teams and made arrangements for social gatherings in order to get better acquainted with each other. These are things that give workers a better working spirit. They didn't seem to mind working as much as those workers who had no organization.

In addition to these factory inspection trips, different company representatives gave some interesting talks discussing different subjects of interest, and still stayed in the farm machinery line. Some of them explained different things in their factories, some talked about factory organization and some about everything in general.



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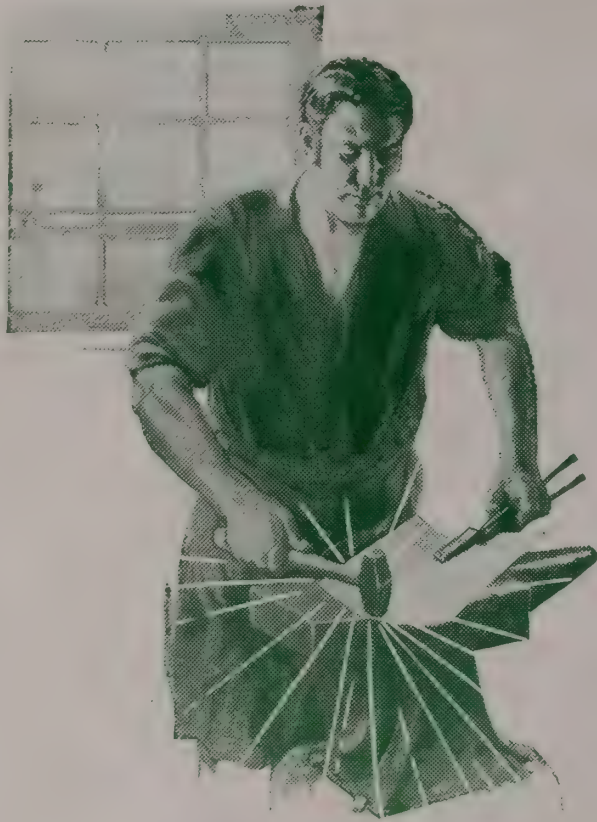
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Back in the middle 1830's a village blacksmith in central Illinois dreamed his dream—a plow that would scour in the prairie soils of the opening West.

It was just a dream until that early spring morning in 1837 when John Deere turned his dream into a reality and laid the foundation of the great organization that bears his name today.

With John Deere, as with every man or woman who leaves an impress on the pages of history, success followed the ability to turn the gossamer of a dream into the granite of achievement.

John Deere, Moline, Illinois

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MARCH 1941

CLEMSON, S. C.



# Waste Becomes Wealth



College men know that a thin mantle of manure on several acres brings about twice the gain in total crop yield, as compared with the same amount of manure in a heavy coat on a single acre. Few farmers take full advantage of this fact because it takes too long to cover the acreage with slow-moving equipment.

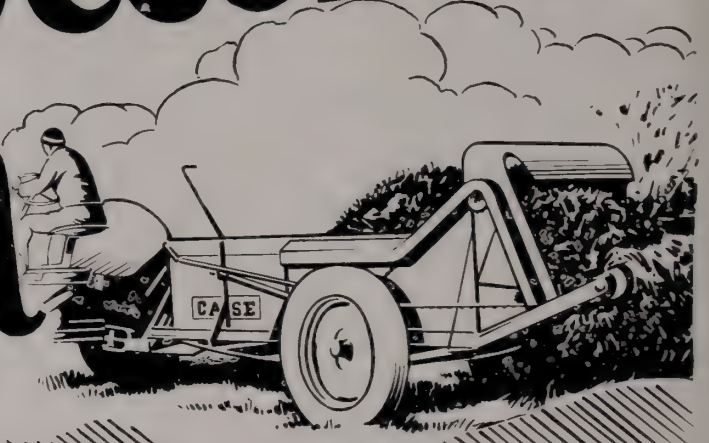
Now, with either of the machines shown here, that waste of crop-producing power gives way to creation of new wealth. Motorized spreading makes thin applications practical because it multiplies the acreage covered in a day. Rubber tires permit spreading at tractor speeds even on rough, frozen ground. Transport from farmstead to field is speeded up still more, even on stony roads.

Hitching is faster because there is no heavy lifting, no jacking up; self-hoisting hitch simply slides to level of tractor draw-bar. Maneuvering is faster because the spreader is built and balanced, steers and

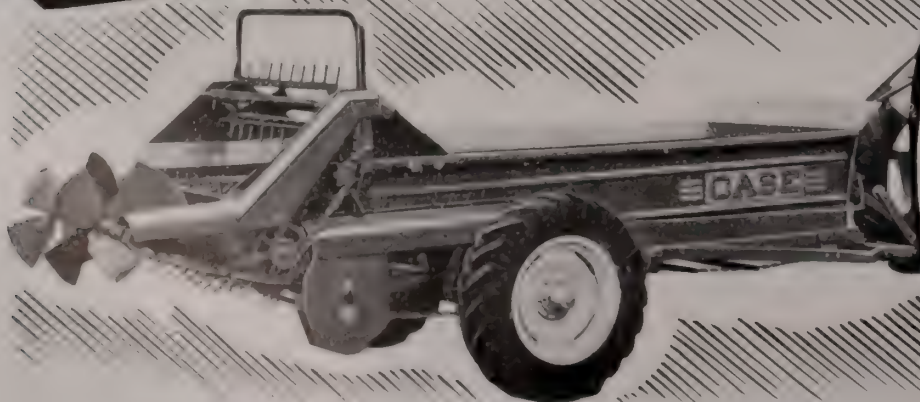
backs like a 2-wheel cart. Loading is faster because the front end lowers for loading, because the low wheels are not in the way. Every detail reduces drudgery, increases daily capacity, encourages better manure management and soil building.

The new low-priced model below has a 70-bushel steel-sided box. Its tires and wheels fit other farm machines, get double or treble service from a single investment in rubber. Both it and the 90-bushel size shown above are built with an apron drive which moves manure more steadily to the beaters . . . and uniformity of spreading is required to make manure do double duty through thin application.

There is also a Case horse-drawn spreader, long famous for its light draft, its double steel backbone, its long life. See any or all models at our factory show rooms or branch houses. J. I. Case Co., Racine, Wis.



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# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 3



No. 2

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Shall Americans look like this? Our people must be kept healthy.

## *The Soil Defends America*

By EARLE C. TRUETT, Jr., '41

*. . . Defense begins at home—our first line is on the farm . . .*

Research shows there is very definite relationship between the soil, the produce of the soil and every form of life drawing sustenance from the soil. It is very true that if the soil is healthy its vegetation will be healthy; and if the vegetation be healthy so also will be the life reared on it. Animals reared on poorly mineralized soils will most likely suffer from demineralization and their susceptibility to certain diseases is greatly increased. Minerals are the basic of the chemical changes that comprise life and they enter into the structure of every cell in the body.

Human bodies contain many elements in addition to nitrogen, phosphorous and potash and calcium. Such elements as copper, iron and many other so-called minor elements play important roles in the proper functioning of the human body. The elements should be in your soil solution on which the plant feeds, to enable the plant to extract them in proper combination from the soil, to store them in the food which you eat, so as to produce in your body, good rich blood, strong firm flesh and bones to prevent disease, tooth decay, the decline of eyesight, and to keep the brain clear, so that it may function properly.

We must ration our soils for better crops. A healthy horse, cow, or human being, can live

for weeks without food and still survive. But all the system's stored up reserve of food, fats, muscle, minerals, will be used up in the fight for life, to evade starvation and death. That is what starvation is—a slow, but steady depletion of reserve elements of food and life, which nature stores in our systems. And it is by this same slow but steady method of farming without replacing such foods as crops use that finally deplete the soil of all the elements of plant life, and leave us a starved soil. It is only recently that we have learned how to ration out livestock with great success. Today we measure out proteins, minerals and vitamins to our hogs, cattle, and poultry, making certain they receive the correct elements in the correct proportion. We also know what elements are required to produce dark colored, tender steaks, solid pork, the heaviest egg production and the richest milk. We also know how to put our land on a scientific "diet". This comparison between the feeding of ourselves, our animals, and our soils is a stepping stone toward providing for a better defended America.

Those diseases of humans such as pellagra, rickets, scurvy, and anemia, etc. are much the same sickness that plants have. Corn and many other crops, for example, show us as best they

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Feeding the soil means feeding the people.



# Giving the Farmer A Start

By R. L. STODDARD, '41

Upon recently conversing with Mr. Frank Kolb, State Director of the Farm Security Administration, I was amazed at some of the circumstances that some South Carolina farmers have been in and what the F. S. A. is doing to help them. Mr. Kolb is a Clemson graduate, being an Agronomy major in the class of 1919. Before becoming connected with the F. S. A. he was County Agent of Orangeburg County, a job which certainly familiarizes one with farm problems and needs. He also stated that the majority of the men in the state employed under him at present are Clemson men.

This state along with others is cooperating with the Federal Government in an attempt to put worthy farmers on their feet. This administration is doing all they possibly can to put the low-income rural group on a secure and independent basis through loans accompanied with technical assistance.

Over a million farm families in this nation were destitute and in need of relief when the depression was at its worst. Much of this was caused by flood, drought, sickness, or other disasters. In South Carolina the majority of this was due to faulty farming (including a one-crop system), faulty credit practices, soil erosion; periods of low farm prices, the burden of debt, and tenure systems that proved wasteful to both the landlord and the tenant.

In the 1935 farm census 62 percent of the 165,504 South Carolina farmers were tenants or sharecroppers. The Resettlement Administration (now done by F. S. A.) during that year transferred 6,000 rural families in this state from the relief rolls to their program. The average net worth was only \$33.63 per family, and the previous year's income average was \$44 per person or a total of \$264.92. These families lacked practically all tools and equipment essential to good farming, including livestock, feed stuffs, and household equipment. Their deficient diets and the lack of medical care took its toll in sickness and death. In spite of all of this these people still preferred self-support to direct relief, an element which must be prevalent if America is to aid its low income group in a democratic way.

The Farm Security Administration is solving this problem by providing a new start for these families. The F. S. A. program may aid in many ways such as readjustments of debts and community loans, but the main activity is that of rehabilitation and individual loans. First, let us see how the over-burdened debtor is aided. This is done by furnishing services or efforts to all who are so heavily in debt that they are handicapped in making a new start. These debt adjustment committee (available to any farmer or creditor) enable the debtor and creditor to reach a mutual satisfactory agreement. Up to July 1, 1939 South Carolina creditors had reached voluntary agreements with 1,336 families living on farms totalling 113,613 acres. Their debts were reduced from \$1,516,122 to \$1,090,064. Foreclosures were saved in many cases and substantial payments were paid to creditors which might otherwise have been bad debts.

In the community or group loans made by this service a total of 2,107 farmers have been aided. Two hundred and twenty three loans amounting to \$158,021.64 were made to cooperative groups to obtain services that they otherwise were unable to get. Some of these loans were used to pay for purebred sires in communities where needed, some for heavy farm machinery, and others for community canneries.

The basic work of the F. S. A. is that of working out a balanced program for each worthy family receiving aid from it. A trained Farm Security Administration supervisor, or an assistant, who is familiar with modern farm management visits each family and works out a program according to their needs and conditions. He also keeps in touch with them by visiting throughout the year, making suggestions when necessary and seeing that the requirements are fulfilled. In this way the farmer "earns as he learns." As soon as he pays off his loan he is free and prepared to carry on in a self-supporting and independent way.

Over 14,000 low-income farmers have been aided in South Carolina by the F. S. A. Some borrowed to buy farms, some just to buy equipment and livestock, and others for both. The

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## Why Keep Bees?

BY F. K. HINNANT, '41

Why keep bees? In this modern age of fast living, and synthetic products, it seems rather odd that such a question as this should be asked. However it is easily answered in several ways.

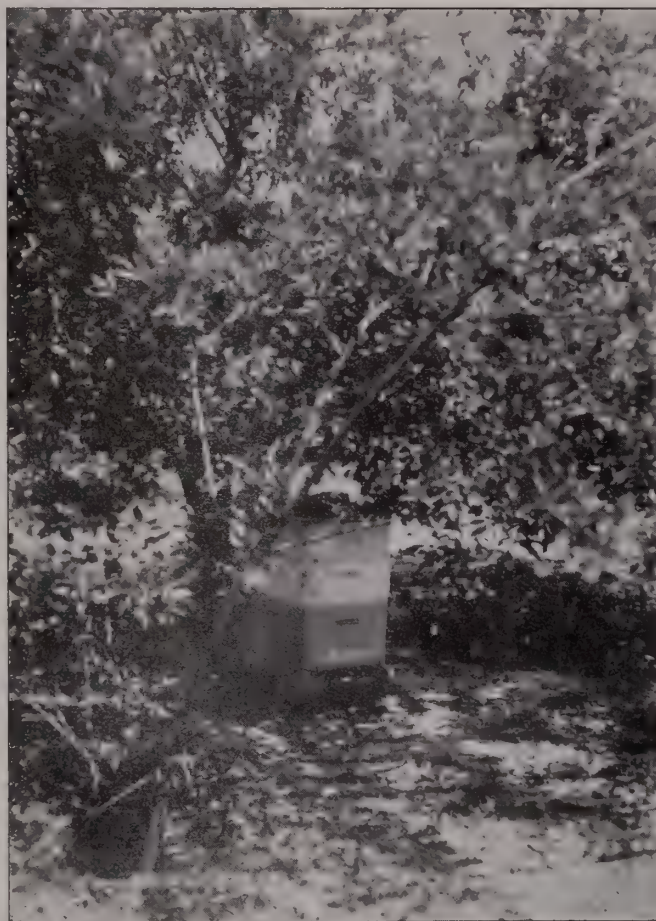
There are several commercial phases of beekeeping of which honey production is the most widely known. Honey is a natural, unrefined, nutritionally valuable food. It is unique in that it is the only unmanufactured sweet available in commercial quantities. People have known and realized this since beekeeping was first inaugurated, but only today are they appreciating this fact and using it to advantage. Honey is now being used in large quantities as a bay food and in many other foods. It, like ice cream, has become a necessary food instead of a luxury.

Many farmers in South Carolina have become aware of this and of the possibilities of commercialized beekeeping and honey production and have turned it into an industry. The average farmer needs only about \$50 to cover the initial expense of buying hives and bees, a little time to take care of the bees and a little information on bee culture and honey plants and he has a hobby that will pay him dividends.

Honey production, however, is only of minor importance to the farmer as compared with another service rendered by the bees. Cross pollination which is so necessary in the development of many of our crops, fruits, and berries is by far the most important service rendered by bees. Its value is from ten to fifty times that of all honey. About twelve to fifteen thousand hives may be used in a state for this purpose. A farmer with bees can kill two birds with one stone. He can get his crops cross pollinated and a crop of honey produced at the same time.

If he is real industrious he may kill another "bird" by renting a few of his colonies to a neighbor who needs and does not have bees.

Up until a few years ago, honey production and cross pollination were the only two reasons why bees were kept except possibly for the beeswax which plays such an essential part in the cosmetic industry. Now, however, the package bee business has arisen and is taking its place among the commercial phases of beekeeping. This business arose when northern honey producers found that they could buy bees pro-



Easy to keep, bees cross-pollinate crops and produce honey at the same time

duced in the South cheaper than they could raise them and take care of them through the northern winters. So now the beekeepers in the North buy bees by the pound, produce a honey crop with them, kill the bees, sell the honey and still clear a profit.

This business has grown to enormous proportions, considering the type it is, and how long it has been started. These bees usually sell for a dollar a pound. One year's production of 131 tons in some several Southern States gives some idea of the size of the package bee business. The production of 12 tons by one man is the high for South Carolina.

Another phase of beekeeping which has been commercialized to some extent is queen rearing. Some of this is being done in South



# Good Land Means Prosperous Farming

## GUEST EDITORIAL

Gilbeart H. Collings, Professor of Soils



DR. COLLINGS

Farm prosperity is more easily attained where soils are fertile. This was again brought forcibly to the author's attention last summer when he had the privilege of visiting for two weeks one of the most prosperous farming communities in the American Corn Belt.

This community is located in the northern part of the State of Illinois. It is largely a prairie country composed of such soil series as the Tama, Marshall, Clarion, Webster, Carrington, and Maume. These soil series are probably unsurpassed in the world for corn and oat production. Having visited this community about a decade and two decades ago, respectively, I was much impressed with the changes that had taken place during the last twenty years and I was especially struck with the fact that the pattern of thinking and action of the American farmer is fast becoming standardized over the country. This means that the time has arrived when the soil and climatic factors of most areas in the United States are now the principal determiners of the pattern of farming followed in those areas. The idea so often expressed to the effect that a given section of our national farming community has a corner on intelligence or on laziness is untenable.

The farmers in the Corn Belt community visited were, according to South Carolina standards, extremely well-off. Most of the land in

the area is now under cultivation, and a woodlot is something of an exception although formerly a small area of woodland was present on many farms. Because of this the old wood pile and the chopping block often seen 20 years ago have gone out of existence. Today most farmers in the community use coal for fuel, the order for the coal being phoned to town and the delivery being made to the farm. Windmills which 20 years ago dotted the landscape have almost entirely disappeared.

Most of the farmers in the community appeared to be farming 160 to 220 acres of which nearly all is under cultivation. Pastures are seldom larger than 30 acres. There were a few farms of 300 acres or more and a few of a 100 acres or less. One farmer expressed the belief that a man couldn't make a decent living in that community on less than 125 acres.

Good farm land brings \$125 to \$150 an acre. Practically no commercial fertilizer is used. I saw farms that have been in the same family for three or four generations which have never been limed and which have never received commercial fertilizer, and yet these farms are still making better than 50 bushels of oats to the acre. Many farmers of the community told me, however, that due to continual cropping crop yields have been on a decline for some years. The agricultural leaders in the community advise the use of lime and phosphate, the phosphate to be applied as rock or superphosphate, but the results secured from the application of these materials did not appear very impressive.

Like most farmers the country over, the farmers in this Illinois community were largely interested in cash crops. Their cash crops are corn, oats and soybeans. Little wheat is grown because the farmers fear an outbreak of chinch bugs which usually follow the harvesting of the wheat crop. Only occasionally does one see a field of Timothy, red clover, or alfalfa, and when these crops are grown they are usually grown to be combined for seed. Soybeans at present prices are not as popular as formerly when they

Continued on page 36

# Agricultural Engineering and National Defense

BY A. F. BURGESS, '41

On every hand we are confronted with different aspects of the National Defense. Agricultural Engineering is playing a big part in proving the relationship between engineering and leadership. However, these are two different things, since many engineers are not leaders, but it is easily seen why it would be very desirable if the two were combined in more of the same individuals.

The affairs of men need more leadership and a higher character of leadership. Leadership is said to be the result of a combination of personal qualifications as inherited by most people to a greater or less degree, subject to development, but which few individuals develop in themselves to their fullest capacity. Most men who become engineers, as a result of the discipline of engineering training and work, develop the qualities of intellectual honesty and personal integrity which guide leaders in the direction they are to follow. All of the leadership which will develop in this country can never be furnished by engineers, but a greater attempt should be made by engineers as individuals and as a profession to develop and exercise their capacities for leadership of high quality.

The relation of agricultural engineering to agricultural production phases of a defense program is obvious. Increased economic and mechanical aspects of modern defense further suggest that training and experience has qualified many agricultural engineers for important work in military phases of the defense program, and in non-agricultural as well as agricultural phases of the national economic foundation for defense. Engineering ability and accomplishment in effective use of men, materials, energy, and mechanical equipment are of greatest importance to the defense program.

Some of the agricultural problems of national defense are: the continued production of staple commodities and increased domestic production of important commodities or of substitutes for commodities previously imported.

Plans need to be made and ready to put into effect when the occasion arises, to adapt production to new requirements and conditions which might be needed in greater and some in smaller amounts.

Since defense with a large army and navy is considered, plans must be made for continued farm production with reduced manpower. Plans must also be considered for maintaining farm production without benefit of some areas now in production. Plans for further decentralization of farm product storage are suggested as defense against "fifth column" activities.

Almost every substantial defense considers the possibility that certain very important materials now used in making farm equipment may be exhausted or hard to get for such use. Planning for redesign and use of substitute materials is essential.

Other problems that seem to be more evident now are involved in maintaining supplies of organic materials. Some of these have been imported in large quantities. It is possible that the production in this country might be started or increased in the case of sugars, starches, proteins, vegetable oils, fibers, and other organic compounds of importance.

Defense considerations suggest that the whole subject of organic material requirements, present sources, and possibilities, means, and economy of domestic production be looked into and studied for opportunities to improve our position by agricultural engineering attention to nature, variety, methods, and economy of American farm production.

The immediate urgency of defense measures is very great, but there is also occasion to look and plan ahead for a sound agriculture when the immediate defense emergency has passed.

The nation realizes the freedom and opportunity that our present defense program seeks to preserve.

— THE AGRARIAN —

The proper measure of a man is the size of the achievement or office required to make him feel important.

— THE AGRARIAN —

More than a billion dollars can be furnished home seekers through the facilities of the Federal Home Loan Bank System.

— THE AGRARIAN —

Texas highway sign: "This is God's country. Don't drive like hell."



# Blue Mold of Tobacco

BY W. H. McNAIR, '41

*... An obstacle in the path of tobacco profit, blue mold can be controlled ...*

Blue mold is a disease that is very much feared by the growers of tobacco in South Carolina and adjoining states. In the years 1932 and 1937 severe damage was done to tobacco plant beds in many regions and growers had to secure plants from other communities with which to set out their crops. The damage during other years was not as severe.

This disease may attack the young plants on the bed or those that have been transplanted to the field, but it is most frequently seen on the plant beds. The date of appearance seems to be about the same time that the flowering dogwood begins to bloom. The first symptoms of the disease on a bed are the turning downward of the tips of the leaves. Shortly afterwards a bluish, downy coating appears on the undersurface of the attacked leaves; hence, the name blue mold. If the weather is cool and damp the upper surface may take on a yellow color that looks as if the leaves had been scalded, and a characteristic odor develops. During dry, warm periods the leaves may show dark brown specks within yellow spots with little or no downy coating on the underside of the leaves. Small plants seem to have more difficulty recovering than older ones and may be entirely killed by the attack. Growth is retarded and if the plants do recover the farmer is late in getting his plants in the field. If infection takes place in the field shortly after transplanting, the leaves may develop symptoms similar to those seen on the beds during warm, dry periods.

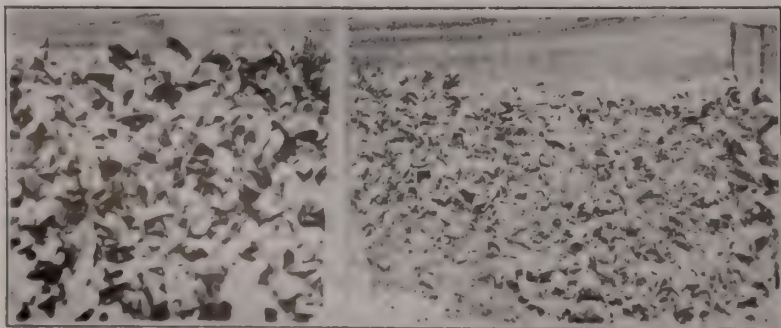
For the past few years methods of control haven't been very definite, but several promising

treatments are now being tried and thought to give control. Among them are benzol fumigation, copper oxide spray and paradichlorobenzene. Paradichlorobenzene seems to be the best one found so far.

The benzol gases are very poisonous to the blue mold fungus, but the tobacco seedlings can withstand greater concentrations than can the disease. Best results are secured by the use of narrow beds because a more thorough fumigation may be had and the technique of application is simplified. Small pans around the edge of closely constructed beds hold the liquid until it evaporates sending the fumes down over the plants. A heavier cover than is ordinarily used is needed to retain the vapors. This treatment seems to give fair control.

Farmers haven't taken to the copper oxide spray method very rapidly because the spray is very difficult to prepare and keep emulsified. Most farmers don't have the proper materials with which to apply this material either. This spray will not prevent infection under extremely suitable conditions for infection or during an epidemic. It is of practically no value as a cure after the plants are already infected. It may decrease the damage done by the disease though.

The easiest treatment to apply and the one that seems to be the most "sure shot" method of control is paradichlorobenzene, commercially known as "P. D. B." It is applied in crystalline form and the size six crystal seems to be the best to use. Fairly tight beds should be constructed and the crystals can be sprinkled on top of the regular tobacco cloth used as a cover, about three pounds per one hundred square yards of bed area. Another cover with threads close together (50 to 60 per square inch) should be drawn over the original cover so as to hold the fumes under and prevent air currents from carrying them away. These fumes are heavier than air and will naturally settle down over the plants. Application should be made about sundown and the heavy cover taken off the following morning before the sun gets hot. This treatment does



One means of preventing blue mold.

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# Electric Hot Beds

BY J. E. COTTINGHAM, Jr., '41

A Norwegian engineer accidentally hit upon the idea of growing plants with electricity in 1922 when he noticed grass growing greener and more advanced over a network of overloaded electric cables. He conducted extensive experiments along this line, and, as a result of these experiments, within five years 12 percent of all cold frames in Norway were electrically heated. Electric hotbeds were first used in the United States in the state of Washington in 1925. However they were not very satisfactory at first, and for several years they were not widely used.

The development of a satisfactory heating cable that could be buried in the soil gave a great impetus to the trend toward electric hotbeds. Today, the standard heating cable consists of high resistance wire electrically, mechanically, and chemically protected by suitable wrappings. The standard cable is lead covered to protect it from water and comes in sixty and one hundred and twenty foot lengths. The sixty foot cable requires 110 volts current and the one hundred and twenty foot cable requires 220 volts.

The kind of plants to be grown determine the depth that the heating cable should be placed in the sub-stratum. The latest Extension Service bulletins recommended that the cable should be placed near the surface for germinating seed, at the bulb for bulb plants, and in the center of the root system for all others.

Dr. J. B. Edmonds and Mr. G. H. Dunkelburg of Clemson College have done some very interesting work on the propagation of sweet potatoes in electric hotbeds to determine the best horizontal spacing of the cable and the best temperature to use. They recommend a ten inch horizontal spacing and a temperature of from 83 degrees to 85 degrees Fahrenheit. However, a six to seven inch spacing is considered standard for all electric hotbeds.

A simple thermostat is used to control the heat in electric hotbeds. These thermostats are accurate within about one degree and are absolutely dependable. Since different plants require different temperatures, it is very important that the operator know the correct temperature to use. Below is a table taken from The Farm Electric Handbook, R. E. A., Washington,

D. C., giving the correct germinating and growing temperature for several plants.

Crop	Germinating Temperature F.		Growing Temperature F.	
			Clear	Cloudy
Cabbage	60	65	55	50
Lettuce	65	65	55	50
Pepper	80	75	65	60
Sweet Potato	75	75	70	65
Tomato	80	70	65	60

The first question that comes to the farmer's mind when you mention electric hotbed is "How much will it cost?" The answer to this question is very reasonable. Soil heating cable costs approximately six cents per foot resulting in an investment of from \$1.00 to \$2.00 per sash depending upon the horizontal spacing of the cable. Thermostats range in price from \$6.00 to \$9.00.

The design of the hotbed frame is as important as the electric heating unit itself. Since standard hotbed sash is 3' by 6', hot bed frames are usually built in 6' widths and any multiple of 3' in length. Ordinary 1" rough lumber has been used very satisfactorily for constructing hotbed frames. If a permanent bed is desired, concrete or 2" dressed lumber (painted) may be used. Creosoted lumber should not be used since creosote frames are apt to injure the young plants.

Particular attention should be given to the location of electric hotbeds in order to in-

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A new development in hotbeds, electricity is found satisfactory



# The Havoc of the Hurricane

BY H. C. ZERBST, '41

During the month of August 1940 the soils of Coastal Carolina were swept and partially covered by a hurricane. This hurricane caused the rising of the creeks and rivers, covering the soil in varying depths with salt water. In most cases only a small portion of any one grower's field was covered.

At this time of the year the only truck crops in the fields were newly seeded cabbage, rutabagas, turnips, and broccali. All of these crops were destroyed by the wind and the rain regardless of whether or not salt water had covered them. Cover crops vary in their susceptibility to salt water injury. The majority of the grasses are tolerant, Bermuda even thriving on salty soil. Legumes, however, are very susceptible to salt water injury.

The amount of salt remaining in the soil depends on several factors such as: length of time that salt water covered the soil, physical condition of the soil, topography, and subsoil drainage.

Freshly plowed land absorbed more salt than those soils which were planted and had not been cultivated for a rather long time.

At varying intervals since the hurricane samples have been taken from the profiles at definite locations.

The samples have been studied and attempts made to determine the response of crops grown on these soils. Some of the conclusions drawn from these recent experiments are as follows: the most susceptible crops to salt are beans, peas, and lettuce; turnips, beets, cabbage, potatoes, and small grain are more tolerant of salt.

Salt concentration varies with the rainfall. During the period from August to January sufficient rain fell for crop growth but not enough for leaching to occur. As the soil dried out the concentration of salt in the surface soil increased, and as the subsoil moisture began to rise to the surface more salt appeared in the top soil. During such periods plants that had commenced to grow died from salt toxicity. When a rain did occur some of the salt was leached downward, and a noticeable increase in plant growth was evident for the next few days, but with all of these barriers and difficulties these plants struggled through the season, but no marketable crop was made.

The last samplings made were just before Christmas, and they showed a greater salt content than the sample taken immediately after the hurricane. Between Christmas and January 15th a very heavy rainfall leached much of the salt from the surface. Subsequently there was found to be an increase in the salt content of the subsoil at a depth of approximately fifteen inches. If rains continue until this salt is leached to a depth where it will not return to the surface by capillary movement of soil moisture, crops on this salty soil will grow all right. If the rains do not leach this salt away, it will return to the surface of the soil when the dry weather of spring arrives. If this condition occurs, there will be a marked damage to the crops growing on such soils.

This common salt, or sodium chloride as it is chemically known, replaces many of the minerals from the soil. When this situation arises an increased acidity is noticeable, and a deficiency of many minerals occurs. Liberal liming and fertilization must be practiced on these soils if good crops are to be obtained in the year immediately ahead.

Compliments of  
*Clemson College Laundry*

# Bird Banding At Clemson

BY ORDWAY STARNES, '42

Bird banding in the United States dates from the time of Audubon, who, about 1803, used silver wire to mark a breed of phoebes. The following season two of the banded birds came back to the same vicinity. Since that time several banding or marking schemes have been tried, one of which was the American Bird Banding Association, organized December 1903. The work of this group was so successful that it demonstrated the possibilities of extensive banding operations. In 1920 the Biological Survey took over the work of the American Association and activities have progressed until there are now more than 2,000 cooperators banding birds in the United States and Canada. The cooperators contribute their work entirely without pay, their remuneration being the pleasure they derive from the association with the birds, recreation or the following of some special problem of their own.

The first step in operating a station is, of course, the catching of the birds. A large variety of trap designs are furnished by the Biological Survey and each operator modifies them to suit his own particular needs. The types used at Clemson are all modifications of the drop system; i. e., the birds are enticed into the box shaped wire covered trap and in feeding spring a trigger that releases a door. The usual number of traps used on the campus is 12 to 15, depending on the season. During the winter the traps are visited three to four times a day, but during the spring season they must be visited every hour or two as the birds are nesting and must be freed to care for their young. The captive bird is marked by placing on the leg a small metal band. The band in no way inconveniences the animal, and will last longer than the expected life span of the bird. These numbers are recorded on regular forms and forwarded to Washington every six months. If the operator catches a bird already wearing a band placed there by himself this is known as a repeat, or return, if six months have elapsed from banding date. If the band was placed by another station, it is then referred to as a foreign return. This is a highly desirable occasion at any station, as the number of foreign returns is quite small as compared to the total number of return of all kinds. We explain these terms as we shall refer

to them later. If a bird banded at Clemson is taken, say in Tennessee, by another operator, the Biological Survey upon receiving his reports will notify us as to the place and date it was retaken. The same transference of information takes place if a bird is killed or found dead and reported, by others. So at this time, may we ask, if you hear of any one finding a banded bird, please make some effort to see that it is reported to Washington.

The total number of birds banded at Clemson during the last 6 years ending February 18, 1941 is 6,468, while the number caught was approximately 15,000. The total number of species is 58.

## Below is a Statistical Representation of Birds Banded At Clemson and Returns Sent to Washington

Common Name	Nos. Banded at Clemson	Nos. of returns sent to Washington
1. White Throated Sparrow	2024	101
2. Chimney Swift	1908	5
3. Cardinal	488	20
4. Blue Jay	472	14
5. Towhee	412	7
6. Brown Thrasher	401	11
7. Tufted Titmouse	91	18
8. Catbird	67	6
9. Carolina Wren	91	3
10. Robin	61	1
11. Wood Thrush	40	6
12. Mocking Bird	25	1
13. Hermit Thrush	6	1
14. Ring Neck Duck	39	3
15. Little Blue Heron	177	3
16. Myrtle Warbler	2	2
17. Screech Owl	17	1
18. Dove	54	1

Many of these birds have been caught one, two, three, four, and in the case of one Chimney Swift, five years after date of banding. This proves not only that birds live a number of years, but also that they return to the same places.

Other species of which there have been no returns sent to Washington as yet are, Field Sparrow—5, Chipping Sparrow—43, Blue Bird—33, Flicker—23, Quail—13, Song Sparrow—12, Slate Colored Junco—11, Red Eyed Vireo—9, Summer Tanager—6, Crested Flycatcher—5, Red tailed—2, Fox Sparrow—2, Yellow breasted Chat—2, Phoebe—3, Orchard Oriole—2, California Quail—2. And one each of the following species. Snowy Egret, Louisiana Heron, House Wren, Oven bird, Little Green Heron, Mary-

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# Choosing A Farm

BY L. C. HAMMOND, '42

Choosing a farm is the first and most important task confronting the prospective farmer. It often means choosing a place to live and work for a lifetime. Too many farmers fail to give the task a thorough thinking-through with the result that the many factors which will determine success or failure are not adequately considered. A book could be written on "Choosing a Farm", but it is desired that this article may show the prospective farmer the necessity of much thought and use of common sense on his part before he can choose a farm on which success can be realized.

First, one must decide the type of farming which he prefers. This will affect the general location of the farm. Cotton farming will be done in the South, and tobacco farming in certain areas of the Southern States. A dairy farmer must choose a location where markets are available, and a soil type to which grasses and other forages are well adapted. The farm should not be chosen in a locality which is adapted only to the desired type of farming, but in a locality where other factors are good, such as, desirable social conditions, good markets and good water supply.

Everyone desires to live where good health, happiness, home comforts, and social activities can be enjoyed. To realize this a farm should be in a thriving community, near schools, churches and neighbors. The climate may be ideal, the soil may be productive, and all the essentials for making money may be present on a farm, but if the farm family cannot mingle with people who have high ideals and a desire for better living, this poor community hinders the most desirable living, just as such other factors may hinder the most profitable production. Desirable living conditions can be found in a peaceful, law-abiding, hard-working community where it is the desire of each farmer that his children shall have a place as worthy citizens in the world of tomorrow. Bringing up a good family should be the greatest desire of every farmer, and every plan, whether for a larger farm, an increase in the number of livestock, or for a combination of factors for increased profits, should have this aim as its goal.



A good home and well kept grounds make for the most desirable living on the farm.

Climate is one of the fixed factors over which man has no control. In many areas other factors may be ideal for profitable farming, but because of temperature or rainfall no farming can be done. Because of climate we find some areas more thickly populated than others, for most farmers locate where the growing season is sufficient for crop production and where temperature and moisture are such as to permit relatively high yields per acre. In choosing a farm many pitfalls may be avoided if the time and amount of rainfall, the length of growing season, and the frequency of early frosts, storms or other unfavorable weather conditions are known.

The earning capacity, affected by the climate topographic features and soil conditions, may determine whether or not the cost of the farm is ever repaid. Some farmers today are puzzled about the success of their fathers and grandfathers many years ago on the same land. They fail to realize that they are actually not farming the same land, but are in many cases using the subsoil whereas their ancestors used the rich topsoil. Erosion has caused complete abandonment of many once highly productive farms, and sent the farmers who kept trying to eke out a living

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## *A Preview of the Clemson Ag. Fair*

As Clemson is one of the highest rating Agriculture Schools in the South, we, the Agricultural students, have decided to put on a two-day exhibition of the work we are doing at this institution. This exposition, which is to be called the Clemson Ag Fair, is put on entirely by the Ag students; although helpful suggestions and one hundred percent cooperation is being given by the faculty members.

Every major department is to have an exhibit, and in addition the Bacteriology, Poultry, and 4-H Club will also give exhibits.

The projects of different departments will be held in Long Hall (Clemson's new agricultural building), the dairy building, dairy barn, and the library. There will be plenty of free entertainment that can not be surpassed by any group of entertainers in South Carolina. There will also be reels on vitamin deficiencies of animals, rural South Carolina problems, and nutritional deficiencies of plants running continuously.

In the dairy exhibit there are a few things that you don't want to miss: (1) The churning and printing of butter, (2) The making and freezing of ice cream as only "Big Ben" Goodale and his seniors can, (3) The pasteurization of milk, and the showing of how to determine the amount of butterfat in "Ole Bossie's" milk.

At the barn you will be able to see the most up-to-date milking parlor in the United States. There will also be a calf feeding demonstration by the "Nipple Pail Method". Different feed mixes will also be shown.

The Agricultural Engineers will have an outstanding exhibit as usual. In a classroom they are going to show you how they plan to run their farms. They will present a miniature electrified farm with running water (using glass tubing as pipes). Colored water will be used to show all the graduates of the Ag Engineering department and where they are located. A metal electric hot bed with a glass cross-section showing actual growing plants will be on display with a student in charge to explain the details of its construction and operation. A newly designed method by a Clemson student for keeping baby piggies warm on frosty nights will be on display also.

The Agricultural Economics boys are going to show you something that you have wondered about: Where the tax money of South Carolina goes, and how it is collected. Good farm management will be demonstrated on a small model farm. The value of education in regard to labor income will be shown as will a very interesting demonstration of calculating machinery (addition, subtraction, and multiplication). An exhibit of marketing showing how South Carolina products are distributed will also be of interest to all of you who are concerned with Agricultural South Carolina.

The 4-H Club will have a booth that will open the eyes of all observers and make other 4-H members proud that they belong to the organization.

The Horticulture Department is putting on an exhibit that will seem impossible to you. A sweet potato weighing one hundred pounds that has never been in the soil. (Don't take our word—come and see it.) You will see cuttings of all kinds, treated and untreated seeds, types of greenhouse plants, landscape design, and vegetable exhibits.

The Agronomy Department will give plenty of competition for the best exhibit. Here you will see plants of all kinds in all stages of growth; clovers, grasses, wheat, corn, oats, and cotton varieties will be shown. The effects of inoculation will also be demonstrated. They will show where your fertilizer comes from, how it is mixed and the value of a high analysis fertilizer. Quick test showing acidity and the amount of phosphorus and potassium in the South Carolina soils will show you amazing things about the soils of your community.

The Bacteriology Department will show germs that cause different diseases.

The Poultry Department will have biddies hatching under glass.

The Animal Husbandry Department plans to have the best exposition in the entire Fair. Exhibits of all types of college livestock will be shown. These animals will be fitted for showing according to the practices followed by leading showmen throughout the nation.

Saturday night at eight o'clock the big horse show gets under way on the football field (also

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# Farm Mechanization

M. O. BERRY, '43

The successful farm of today is, of necessity, mechanized. For example, when wheat was grown entirely by hand labor, approximately 56 hours was required to plant, cultivate, and harvest an average acre yield of 20 bushels: whereas with the present farm set-up of today only 3.3 hours is required to accomplish the same amount of work. True it is that the present initial cost is greater, but this cost is more than offset by the saving in time and labor, greater efficiency of production, superior product and greater total production.

There are two general classes of machines used today by the farmer. First is the special crop machine such as the potato planter and digger, corn picker, cotton harvester, and cotton gin. The most advantageous use of these machines would be to operate them cooperatively. The second class of farm machinery is the adjustable machine such as the grain drill, row-crop cultivator, binder, reaper, and tractor. Each of these machines can be adapted to several uses. For example, the tractor may be used for cultivation, or as a stationery power plant for jobs such as threshing, and as cutting wood.

One common fault among present day farmers is the lack of care for farm equipment and costly machinery. Proper oiling is essential to the long life of frictional surfaces; and a grade of lubricant should be used that is the thinnest

oil that will stay in place and do the work. Exposure to weather conditions is the main cause for rusting and rotting of parts on machinery; so exposed surfaces should be kept free from dirt and dust which would hold moisture, and cause deterioration.

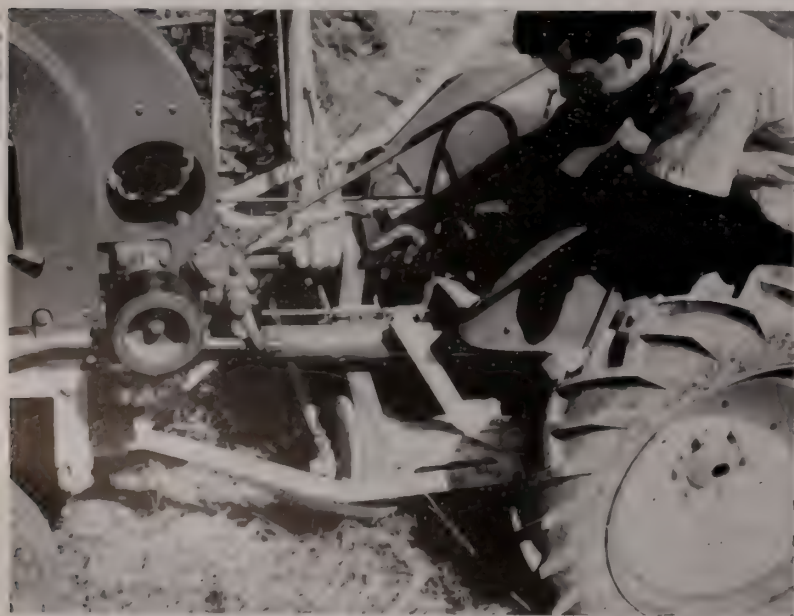
Much improvement can yet be made in developing farm machines. Instances that are most noticeable are a need for:

1. A cotton picker that will not damage the stalk.
2. A new steel for moldboard plows.
3. A sorghum header to cut stems of uniform length.
4. An automatic puller and toppler for beets.
5. Devices for the comfort of the operator.

Research has played a major role in modern machinery. The development of new type roller bearings, new alloys of steel and cast iron, and the V-belts and pulleys have improved the efficiency and lasting quality of farm machines so as to greatly reduce repair costs. Also, research in size, type, and requirements for different sections of the country has done much to foster the best machines for certain areas. For instance, the typical Southern farm is fairly small. Manufacturers had formerly produced huge tractors and implements for consumption and use on the large Western farm. These were too large and cumbersome for the average Southern farmer; therefore research men secured data for the specifications of smaller equipment to suit the requirements of the small farmer. The research also helped the manufacturer to realize that most farm machinery must withstand considerable exposure to weather; so wood parts were either wholly or partially replaced with alloys of certain metals to prolong the services of the machinery. Notable examples are the replacement of wooden pulleys with cast iron pulleys and the manufacture of all-steel farm trucks and wagons.

One of the newest phases of farm mechanization is taking place now in the farm home and farm buildings. Utilization of electricity is this new phase. Farmers are now becoming wise to the fact that electricity can have other uses than just for lights and radios. Installation of electric pumps, electric motors, refrigerators, and

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Machinery means modern farming

# THE AGRARIAN PRESENTS

## W. A. SHANDS



W. A. Shands

Mr. Shands, originally from Florence County, S. C., was prominent in his class as a student and a singer in the Glee Club. After completing his work in Entomology at Clemson in June, 1926, he attended the University of Minnesota for three years, obtaining his Master of Science degree in June 1928 and continuing his studies for one additional year. While there he held the position of teaching assistant for courses in Zoology and Insect Ecology. This was very helpful to him as the major emphasis in his studies was placed in insect ecology and experimental zoology.

Since July 1, 1929, Mr. Shands has been with the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture. His first assignment (as Assistant Entomologist), which continued until July, 1935 was for the investigation of insects affecting sugar beets; the research performed being with the beet leaf hopper which transmits a virus disease known as curly top of beets. Most of this work was done at Grand Junction, Colorado. The work, however, took him all over Colorado, Utah, New Mexico, and Arizona where intensive studies were carried out.

At about this time he was transferred to Oxford, N. C. to serve as a leader (Associate Entomologist) of the newly-initiated research on insects affecting flue-cured tobacco growing in the field. Although headquarters were at Oxford, investigations of this nature were also be-

gun soon afterward by the Bureau of Entomology and Plant Quarantine in cooperation with the South Carolina Experiment Station at its Pee Dee branch near Florence.

The investigations at both places were both ecological and toxicological in nature, involving essentially the tobacco flea beetle, horn worms, and bud worms.

In June, 1940, Mr. Shands was transferred to the Washington office. He now holds the title of Senior Entomologist, serving in the capacity of Assistant Chief of the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine. His work in this division includes also that relating to insects affecting tobacco, sugar beets, berries, and greenhouses and ornamental plants.

Mr. Shands was well thought of as a student at Clemson, and he stood well in his classes in Entomology.

We are glad to see him, as an alumnus doing such fine work and forging ahead in his chosen field. It gives undergraduates an incentive to do better work and furnish them a goal toward which to strive.

As the first in a series of features on alumni, we are proud to present Mr. Shands as a brilliant alumnus who has gone far in his chosen field of Entomology.

### THE AGRARIAN PRESENTS—

Beginning with this issue, THE AGRARIAN is establishing a new policy and a new method of recognizing graduates of Clemson College. In introducing distinguished alumni, the selections are made at random, and no department or branch of the School of Agriculture will be represented more than another.

It is the purpose of this page to publicize the work of the man or men chosen, to call attention to their achievements, and to bestow the well-deserved praise and commendation which they certainly merit.

We take great pleasure in introducing to its readers, the first in a series of outstanding Clemson graduates who has contributed to progress in the field of Agriculture. THE AGRARIAN PRESENTS—Mr. W. A. Shands.



# Limiting Factors In Dairying

BY G. W. BALLENTINE, '42

Success in dairying like many other industries, depends upon the farmer's ability to raise the limiting factors of production and marketing to the highest possible level. Without raising the low factors in dairying the farmer is almost certain to be a failure.

Some farmers who are hard workers and know many of the requirements for successful dairying fail because they do not map out a definite plan of breeding for their herd. As a result of the farmer's failure to map out a breeding program he will have a herd of low producing cows which eat almost as much feed as a herd of highly productive cows. It takes just as much time, labor, feed, and capital to maintain and operate this herd as it would a high producing herd.

One farmer's herd of 30 cows produced a yearly average of 4,910 pounds of milk and 340 pounds of fat. He joined a Dairy Herd Improvement Association, which kept records on his cows. The records enable the dairyman to cull out the low producers, and to breed his high producing cows to a proved sire for high milk and butterfat production. In a few years the cows gave a yearly average of 8,265 pounds of milk and 388 pounds of fat. This increased his profit per cow to \$96 or \$2,880 for the herd per year.

There are many limiting factors in production on the dairy farm. Some ambitious hard working farmers find one or more limiting factors in their farming system and at once set about to raise these factors. In raising one or two low factors of production they overlook other factors; therefore, his effort to increase production is lost because it is not the raising of one limiting factor but, the raising of all the limiting factors in the correct proportion, so that the most desirable interaction between factors in production will give the highest possible profit.

In many instances a young man will inherit a farm which is valueless in so far as profitable production is concerned. The land is poor, the fields are small and rough and it will be almost impossible to get the farm into a highly productive state of cultivation. After working hard for the better part of his life he loses the farm and has nothing to show for his life's work.

The successful dairyman chooses a farm which is the correct size for his type of dairy farming and which has the essentials for high production. The buyer should investigate all the facts and should be certain that there are no limiting factors which can not be economically improved. It often happens that the buyer will overlook one unalterable low factor because of a large number of desirable factors.

To be a success in dairying the farmer must be constantly on the lookout for all the undesirable factors with which he is confronted in his enterprise. When the limiting factors are determined they must be economically raised so that they will give the greatest returns over a long period. When the dairyman is able to determine and eliminate the limiting factors of production, his dairy will be productive and profitable.

**MORE COTTON GROWERS**

**"BETTING ON CERESAN"**

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# March of the Nitrogen Industry

BY S. K. ABLE, '42

"By 1930 the Chilean nitrate beds will be exhausted and the world will face a shortage of fertilizer nitrogen and, consequently, a food shortage that might have disastrous results." So said Sir William Crookes, appearing before the British Association for the Advancement of Science at Dublin in 1898. Sir William literally set the scientific world on its ear when he made that gross misstatement of fact. Not only was he completely wrong, but scientists today say that at the present rate of consumption, the Chilean supply of nitrates will be sufficient for another 250 years. This estimate does not take into consideration the thousands of square miles of undeveloped fields in that country.

It is an ill wind that blows nobody good, and so it was with Sir William's prediction. It served as a stimulus to chemists in developing a practical method of obtaining nitrogen from another source. The very thought of losing 70 percent of the world's supply of nitrogen caused scientist and statesman alike to shudder, for not only are nitrates used in agriculture, but they are essential in the manufacture of munitions.

Chemists had known for many years that nitrogen in the atmosphere could be "fixed", but whether it could be done economically enough to warrant commercial production was the question. Engineers were called in to collaborate with the chemists in changing from laboratory methods to factory methods. Costs of machinery had to be developed, and capital was necessary to bring about the atmospheric nitrogen industry.

In 1902 the first attempt at commercially "fixing" nitrogen was made at Niagara Falls, but it lasted only two years because of the high cost of production. Several other processes were subsequently proposed, tried and discarded, but a few, such as the cyanamid process, were successful enough to warrant continued operation. During this time, two Germans, Haber, a chemist, and Bosch, an engineer, developed a process under the auspices of a large German chemical company that far overshadowed the attempts made by other men. In 1912 an experimental plant was producing 10,000 tons per year. With the shadows of war growing, the German government smiled upon this new industry which would

have to produce nitrogen for her war machinery when the time came. Germany succeeded in putting her enemies in a hole when the war did develop, and her commerce raiders began to harass Allied shipping lanes and the loss of nitrogen put munitions production behind schedule.

At the close of the World War every nation became aware of the necessity of producing its own nitrogen. With this in mind, many nitrogen-fixing plants sprang up throughout the world as each country entered the race. Because of this race the atmospheric nitrogen capacity of the world is at present almost twice the annual consumption. This enormous capacity of 3,600,000 tons has been achieved in the last twenty-five years!

During the World War the United States was made a victim of the Chilean nitrate monopoly. Prices soared, doubled, trebled and quadrupled. In our two years of war we paid Chile \$328,000,000. Even the \$127,000,000 invested in the Muscle Shoals Plant failed to produce one ton of synthetic nitrogen. These enormous losses evidently awoke America. By 1928 this country had become independent of Chile. The capacity of American plants now in operation is estimated to be in excess of 540,000 tons annually. This is 165,000 tons more than the peacetime requirement and 15,000 tons more than the estimated wartime requirement.

Due to the fact that the Southern tobacco and cotton farmers are the greatest users of nitrogen, ninety percent of the industry is located south of the Mason-Dixon line, but for a long while after the introduction of this form of nitrates to agriculture, many farmers were dubious and continued to use the old form. Industrial organizations using nitrogen, however, were not so wary and the old form of nitrogen has practically disappeared from the market.

The march of the chemical industries southward, continues. The rayon industry, the soda ash industry, the paper industry, and their smaller, but no less important, brethren led the way, and now the atmospheric nitrogen industry is also on the bandwagon. The modern industrial south is also the modern chemical south.



# Designs In Pig Brooders

BY E. L. McKESSON, '41

The United States leads in pork production by producing twenty percent of the world's supply. Since electricity has been made available to nearly all farms by the power companies and the R. E. A. high lines, the farmers are turning to the use of electricity. Everyone knows that electricity makes work easier, cleaner, safer, and cheaper, and now the rates are within reason; therefore, the farmers are letting electric current help in every way possible.

Farmers have found that the only way to make money with hogs is to see that they farrow twice a year. The way to get the hogs on market when the prices are at the peak is to have the sows farrow in February or early March. The optimum temperature for pigs is 50 degrees F. to 60 degrees F. but in many states the temperature is far below this; therefore some type of artificial heat has to be supplied.

The first type of artificial heat was supplied by lanterns and small stoves. The most efficient fuel which was uniform continuous and gave less danger of fire than wood was oil.

Next an electric lamp was hung on a corner so the young pigs could gather beneath. This idea developed into our lamp type brooder. The two most used types of brooders today are the lamp brooder and underheated brooder.

There are a number of advantages of these brooders. Some of these are:

1. Distinct saving of labor
2. Reliable automatic heat control regardless of changes in the weather.
3. Electric heat does not use up oxygen of the air or give off fumes.
4. Reduces mashing of young pigs by their mother.
5. It will save a larger number of pigs and in this way the farmer will be able to get more hogs on markets when the price is high.
6. More economical, as it reduces the number of sows to feed if sows can farrow twice a year.
7. There are no fire hazards.

There are two types of brooders in use now. The lamp brooder is nothing more than a triangular box well insulated and equipped with a 150 watt to a 200 watt bulb with a reflector of a diameter of eighteen inches. It has a definite advantage as this type gives off Ultra-violet rays.

This ray is necessary as it helps to ward off colds. Many days are dark and dreary, and this helps as a substitute for the sunshine when it is not available.

The other type of brooder is the underheated type. It is a thermostatically controlled heating element housed in a galvanized pan which is placed on the floor of the brooder. The heat is distributed over the floor.

An experiment was run by T. E. Hinton and J. M. Fore, of Purdue University, on these two types. The underheated consumed nine kilowatt hours for four days and twenty-five kilowatt hours for fifteen days. The lamp reflector used 22 kilowatt hours for a seven day period.

An experiment run by Oregon State Agricultural College found a real significance with pigs farrowed in March. Twelve sows and their litters were raised in eight weeks when using an electric pig brooder. Those pigs weighed an average of 29.5 pounds each at 56 days of age and those not so raised (without a brooder) weighed 25.2 pounds each. Another experiment run by the University of California in 1935-36-37 showed that pigs lost for the first ten days averaged 29 per cent in regular farrowing pens when no heat was supplied. North Dakota reports a loss of 30 percent and Nebraska reports on 159 litters showed that mature sows raised only 60 percent of the pigs farrowed. For the same years underheated brooders were used on nineteen litters in California with a loss of only 15 percent, and a lamp type, where heat and light were both supplied, lost only 13 percent.

A report received from Purdue University by T. E. Hinton showed that 41 pigs in houses with heaters gained 0.318 pounds per pig per day while 20 in unheated houses gained only 0.259 pounds per pig per day. This shows 8.1 percent more gain per day per pig over those of unheated houses. At weaning time (57 to 70 days) 39 pigs farrowed in the heated house gained .420 pounds per day per pig while pigs farrowed in unheated houses gained .345 pounds per day per pig. This shows 8.5 percent more gained per day over the ones farrowed in an unheated pen.

Therefore, pig brooders not only help to get hogs on market when the prices are high, but they lessen the losses of pigs for the first ten days by 50 percent.

# Alpha Zeta Holds National Meeting

BY W. M. HOBSON, '42

Two agricultural students while attending Ohio State University realized the need of a more friendly relationship in the promotion of the agricultural profession. These two students, C. W. Burkett and J. F. Cunningham, conceived the idea of a fraternity composed of outstanding students in agriculture. It was to be neither a social fraternity nor primarily an honorary fraternity, but it was to be a service fraternity designed to promote the advancement of the science of agriculture. The outgrowth of these ideas by Mr. Burkett and Mr. Cunningham was the founding of the first chapter of the Fraternity of Alpha Zeta on November 4, 1897. From this meager beginning, the Fraternity rapidly grew into an outstanding national organization.

There are now 16,000 members from 44 chapters located in 42 different states. The South Carolina Chapter of Alpha Zeta installed on April 19, 1930, was the 38th organization chartered.

To solve problems which naturally arise in this large organization, and to insure a closer and more friendly relationship among the chapters, a convention, The Conclave of Alpha Zeta, is held every other year. These conventions are attended by the members of the High Council, the two co-founders, and one official delegate from each chapter. The active Alpha Zeta member representing each chapter is selected from the Junior Class.

The writer of this article was the delegate from the South Carolina Chapter to the 19th Conclave which convened in Chicago from December 30, 1940 through January 2, 1941. This delegate arrived in the Chicago bus station well preserved—in a refrigerated state. From the bus station, he found his way to the Stevens Hotel, headquarters for the Convention. There south met south, yet one south was north. Yours truly was assigned to share a room with the delegate from **South** Dakota.

Before launching into the business part of the meeting, the first afternoon and evening were devoted to the pleasant task of becoming acquainted. East met west, north met south and soon all were the best of friends.

In every phase of the program, social or business, promptness was one of the noticeable characteristics. At thirty seconds before each

time of convening, the High Chancellor would be seen with a watch in his left hand and the gavel raised in his right. Promptly on the hour, the gavel met the table and the Conclave was again in session.

The business was conducted in a very democratic manner similar to that of a well organized legislative body. Any one of the forty official delegates had the right to the floor to either present or discuss a proposal. All proposals were referred to various committees who studied them and submitted a written report. The future activities of the fraternity are determined by these committees.

As 12:00 midnight December 31, 1940 approached, business of any description was the least of the delegates concern. Most of the delegates left the hotel en masse to inspect the downtown area of Chicago. Soon the boys were so hopelessly lost in the rush of the crowd that no two returned to the hotel together. Chicago certainly royally introduces in the New Year!

Among other recreational and social activities, the delegates were treated to a banquet, a luncheon, and an ice hockey game. At the ice hockey game, they witnessed a free-for-all involving the players of both teams, the referee, and several spectators and cops.

The Conclave was deemed a success and all the delegates were complimented for their splendid work.

It is the duty of each delegate to return to his chapter and to interpret all actions of the Conclave to the chapter and see that these actions are abided by. The South Carolina Chapter, since hearing the report from the delegates, has launched an even more active program than it has previously followed in promoting the science of agriculture in South Carolina and in obtaining a more friendly relationship among students and faculty members at Clemson.

— THE AGRARIAN —

Soil tillage is vital if maximum economic yield is to be derived from the land.

— THE AGRARIAN —

"The farm must be made a place of beauty so attractive that every passing stranger inquires, 'Who lives in that lovely home?' "—Dr. Seaman A. Knapp.





## BETWEEN THE

### 4-H Delegates to Raleigh

The executive committee of the Clemson 4-H Club represented the local chapter at the Tri-State Intercollegiate 4-H Club meeting held in Raleigh, February 15. Members making the trip were Bill Derrick, G. W. Jones, K. J. Bodie, and Ben Leonard. Plans were made for the outing to be held at Camp Long the week-end of May 17.

The 4-H Club is taking steps to be actively represented in the Agriculture Fair to be held in March. Pruitt Agnew has been made chairman of the committee to exhibit the purposes and the activities of the 4-H club.

THE AGRARIAN

### Ag Engineers Get Work

Since its foundation in 1934, the Agricultural Engineering Department has had sixty men to obtain their B. S. degrees in that field. Only one man of this number is not employed at present. Graduates have followed various lines of work, the majority being engaged in sales, service and advertisement of farm machinery. Others have gone into private business, extension work, conservation work, teaching, selling fertilizer and a number of other lines of endeavor. Eighteen students will be awarded degrees in agricultural engineering in June.

THE AGRARIAN

### Dairy Club

Guest speaker at a recent meeting of the Dairy Club was Hugh Roberts, regional agricultural engineer for the Portland Cement Association. Mr. Roberts' subject was the history, uses and general properties of cement. After the talk, he held an open forum discussion in which he answered questions from the audience. Agricultural engineers were guests at the meeting.

THE AGRARIAN

### Judging Team

About eleven boys are trying out for the judging team. Those selected will go to VPI in April. This will be the first trip of the new team. The boys trying out are being given instruction daily by the team's coach, Prof. Ed Hauser.

### Ag. Men to Meeting

A group of men from the Clemson Agriculture Department attended the Southern Agriculture Meeting in Atlanta, February 5, 6, and 7. A large number of agriculture teachers, experiment station and extension department men presented papers.

THE AGRARIAN

### Kappa Alpha Sigma

Professor Robert E. Gee, of the Chemistry Department, and Dr. Gilbeart H. Collings, of the Agronomy Department, have been speakers at recent meetings of Kappa Alpha Sigma, agronomy society. Besides presenting speakers on technical subjects, Kappa Alpha Sigma each year gives a social for its members. The club is also taking steps to assist in the Ag. Fair.

THE AGRARIAN

### Alpha Tau Alpha Taps Seniors

Five vocational agricultural education seniors were recently accepted for membership in Alpha Tau Alpha, national honorary fraternity for agricultural education students, announced C. C. Jackson, president of the fraternity.

Those seniors being initiated were: E. C. Jackson, Starr; E. F. Bennett, Vance; D. E. Brazzell, Blaney; L. C. Hicks, York, and R. M. Hendrix, of Greer.

Two vice-presidents of the fraternity graduated at the end of first semester and at the last meeting C. K. Hollingsworth, of Greenwood, and C. M. Eaddy, of Hemingway, were elected to fill out their unexpired terms.

THE AGRARIAN

### Civil Service

Agronomy seniors are making preparations for the Civil Service Examination to be held March 8. The position offered is that of Assistant Agronomist. The junior agronomy students also stood a Civil Service examination recently.

Two mid-year graduates in Agricultural Education have secured positions nearby. R. F. Wheeler, of Saluda, is teaching vocational agriculture at Central, and W. C. Stroud, of Richburg, is doing DHIA work for the Dairy department.



## FURROWS

### Ag Fair Plans

Fair Chairman Marshall E. Walker recently announced that the Agricultural Fair will be held here March 22 and 23. The fair is being sponsored and presented by students in all departments of the School of Agriculture. All buildings of the School of Agriculture will be turned over to the fair and many interesting and educational exhibits will be presented.

Other members of the executive committee are: T. E. Garrison, assistant manager; J. J. Lever, H. W. Hollis and Ben Leonard, promotion; L. C. Martin, E. P. Huguenin and W. M. Hobson, finance; F. M. Kearse, H. G. Way and R. C. Wiggins, exhibits, and P. D. Seabrook, secretary treasurer.

— THE AGRARIAN —

### Future Farmers Elect Officers

Members of the Clemson College chapter of the FFA recently elected the following new officers: C. M. Eaddy, President, D. C. Herlong, vice-president and W. L. Brunson, treasurer. Other officers elected were T. H. Caldwell, treasurer, C. K. Hollingsworth, reporter, and O. H. McKagen, parliamentarian.

The program at the last meeting featured Dr. D. W. Daniel, Clemson's ambassador of good will, who was at his entertaining and informative best. During the business period, plans were made for a social which will be held in March.

— THE AGRARIAN —

### Horticulture Club Sees Films

At a recent meeting, members of the Horticulture Club and the professor of the entomology and horticulture departments were entertained by colored films showing the habits of the codling moth and the Japanese beetle. Mr. Joe Webb, a Clemson graduate now with the Georgia Department of Entomology, explained the pictures. The second portion of the program was conducted by Dr. D. R. Jenkins. Dr. Jenkins' subject was New Zealand and Australia. He is a native of Australia and presented some interesting facts about the continent "down under."

### ANNOUNCEMENT OF FIRST ANNUAL CLEMSON HORSE SHOW

The first annual Clemson Horse Show will be held at Clemson College, Saturday night, March 22 at 7:30 P. M. This show is being put on in connection with the Clemson Ag Fair which is to be held Saturday and Sunday afternoon March 22 and 23. A well rounded program has been planned including ten horse classes and several novelty acts. The exhibitors will compete for trophies and ribbons, and James V. Robinson of Greenville will be the judge. The Clemson Horse Show is planned as an annual event and is being sponsored by the Clemson Animal Husbandry Club. Entry blanks are being prepared and will be sent out to all horsemen in a few days.

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# Forage For Poultry

By E. R. HUGUENIN Jr., '42

One of the biggest and more obvious mistakes made by South Carolina farmers in poultry management is not providing sufficient space for the growing of grazing crops. Green forage is one of the most economical of all feeds, whether for hogs, hens, or cattle. Very often the laying and brooder house are squeezed in between other buildings without proper consideration being given to spacing of buildings or room to plant a green forage crop. Another very common mistake is locating the house and yards on land that is too wet for the best sanitary practices and unsuitable for a growing crop.

Chickens, turkeys, ducks and geese are natural consumers of a large amount of roughage, and the cheapest and easiest way to provide this is to allow them to have free range over a growing, green crop, grass or legume. For this reason poultry yards should be located on well drained fertile soils which is suitable both for the chickens and their grazing. The yards should be large enough to furnish a reasonable amount of roughage over a considerable period. This would require about one acre for every five hundred pullets during the growing season and one acre for one hundred hens that are laying. Turkeys and geese require more green feeds than chickens and so require a wider range and a greater variety of grazing material.

Modern poultry husbandry men recognize the high nutritive value and sanitation benefits to be derived from a satisfactory green range. Succulent green feed from grasses and legumes is one of the best natural feeds and if it is lacking in the poultry ration it has to be made up by expensive feed supplements.

The green fast growing range is an economical source of proteins, minerals, and vitamins, particularly vitamins A and G which are especially necessary in a poultry ration.

Green feeds also have advantages other than nutritional in that it tends to keep the birds busy and content. It may help to prevent feather pulling and cannibalism in growing chickens and laying hens. For these reasons it is vitally essential that poultry should have access to green forage at all times. To supply this for baby chicks, the yards and houses should be arranged so that both can be moved each year so as to minimize the dangers of infectious dis-



Forage is both economical  
and nutritious

eases. This range should supply shade as well as food for baby chicks and pullets.

Among the many grasses and legumes that can be grown in South Carolina a few possess qualities that make them especially desirable for poultry. Permanent sod-forming grasses and legumes together with quick growing plants, both grasses and legumes may be used to provide a suitable pasture through the entire year.

The most important factor in providing a good grazing crop is to have a rich soil well balanced in soil nutrients. Generally this can be obtained by applying one-half to one ton of superphosphate to every acre. Under ordinary conditions this should give excellent results. When crops are closely grazed, application of fertilizer containing readily available nitrogen will be beneficial. If a top dressing is used the poultry should be excluded until a rain has cleaned the forage of the fertilizing material.

— THE AGRARIAN —

## Congratulations

The field house is finally nearing completion and The Agrarian extends its heartiest congratulations to Coach Frank Howard and his staff for their fine work and the new acquisition. Members of the fairer sex who come to Clemson dances will be more than glad to know that rooms are provided for them. These rooms will be used for members of visiting teams also. Lounges, dressing rooms and a canteen go to make this a complete unit.



## Low-State Erosion

BY CAROL M. EADDY, '41

The need for Soil Conservation in lower South Carolina has, until recently, been more of a paradox than a reality. Farmers have not been made to realize the paramount importance of conserving their soil, their most prized and irreplaceable possession. So far they've failed to attach the proper significance to an old but true statement, that an ounce of prevention is worth a pound of cure especially when applied to soil erosion. When applied to the irreparable effects of soil erosion, the value and benefit of purposely waiting to learn through inference and observations of one's own soil may be said to be comparable to the value of a farmer engaging a veterinarian after his horse has died.

It therefore seems needless to say that when applied to the farm, especially the soil, the cost of learning by allowing the destructive forces of soil erosion to work freely far exceeds the benefit received therefrom. Knowledge is costly, but experience is priceless. The fallacy of the farmer to gain knowledge of soil erosion through the teachings of his experience is as foolish as the idea of a swimmer diving into a pool that contains no water. Why have not the farmers been made to realize, as they have in the Piedmont, the necessity and importance of avoiding such useless experience, and the need for protecting this land against these merciless forces of erosion?

A suggestive reason is that it may be attributed to the lack of emphasizing the total annihilation of the soil resulting from free soil erosion, especially sheet erosion, which is the predominant type in the lower part of the State. Paradoxical as it may seem, it is a mystery to many farmers why their soil becomes poorer from year to year. And although other attributes must be recognized at this point in claiming a share of the causes of this approaching annihilated condition, sheet erosion may justly be credited as being responsible to a notable extent.

Another reason why Low-State farmers fail to realize, before it is too late, the desperate condition of their soil so cunningly produced by sheet erosion, is the subtle way in which this type of erosion works. It carries in its subversive wake, deception and concealment. As long as it remains as sheet erosion it ingeniously pre-

cludes all reason for the farmer to be alarmed. At the same time the most widespread and worst type of erosion in existence is gradually but surely and most effectively removing from the land its precious and priceless top-soil.

This useless devastation of farm land must be reckoned with immediately. Little do we realize that the soil, "Our Heritage," cannot be replaced. There is no substitute for it. Once lost, it is definitely and forever irretrievable. Yet, those of us in the lower part of the State seem to be too busy gaining a livelihood from our soil to concern ourselves with such an insignificant matter as erosion control. That is a comparatively new term to us. We have not needed it before, why should we need it now? We just have the advantage over those who choose to live where erosion is more serious. What reason have we to regard it as being serious when we are unable to observe any apparent effects of deterioration. If it is easier and more convenient for us to run our rows straight and on a down-grade, we'll do so. A little sand or silt may wash down some rows, but what does that matter, it's not enough to make a big difference.

To the farmer who believes there can be logic for such disdainful and preposterous reasoning, may his crude, ignorant, and pathetic way of thinking be somehow influenced to the contrary; perhaps by some free but competent advice or by merely observing soil that has been destroyed by erosion. If this does not convince him and cause him to change his way of thinking, he will be left in the hands of fate, and fate, itself, will take the critical step towards proving to him how exceptionally wrong he was.

It has often been said that experience given away is seldom appreciated, and so it is with advice. Therefore, when a farmer completely ignores the free and authoritative advice concerning soil erosion, regardless of what happens to his soil, he alone is responsible.

It has been sedately said that the largest room in existence is the room for improvement. Could any statement be more applicable to the present prevailing condition of our soil from an erosion standpoint?



# Green Manure Crops

BY R. N. GLEASON, '42

A green-manure crop is any crop grown and plowed under while green for the purpose of improving the soil, especially by the addition of organic matter. These crops affect the supply of plant nutrients, and improve the physical condition of the soil, which is important in erosion control.

Nearly all the organic matter in the soil has as its source decayed plant material. The roots of plants is the greatest source; however, stable manure and green manures have been used to supplement this source. Many conditions affect the amount of organic matter that actually accumulates from the decay of these materials.

A large part of the plant material disappears during decay as carbon dioxide. It has been found that on sandy soil in a hot climate, the conditions are unfavorable to the extent that the loss may be so excessive that no permanent addition to the soil organic matter is made even by turning under a heavy green-manure crop.

When a single green-manure crop is turned under, no very large addition to the soil organic matter can be expected. If a crop that will yield a ton of dry matter per acre is turned under, only about one-half will become a part of the humus because the other half is quickly lost as carbon dioxide or in other ways. If 1000 pounds were added a year, 40 years would be required to double the organic matter in a soil that contains 2 percent of organic matter (40,000 pounds per acre) in the surface soil. This illustration points out that the main object of green manuring must be to maintain rather than to increase the quantity of organic matter in soils.

Both legumes and non-legumes are used as green-manure crops. Legumes add both organic matter and nitrogen, whereas non-legumes add organic matter only. Such a crop as rye or sorghum will supply more bulk than a legume. This fact is one to be considered, because from the standpoint of maintaining organic matter of the soil, bulk is of first importance. Non-legumes contain a lower percent of protein and a higher percent of carbohydrates than legumes. When non-legumes decay, a large amount of energy is formed. However, the bacteria responsible for decay requires an excess of nitrogen. Non-legumes often fail to supply this nitrogen, and the bac-

teria use the available soil nitrogen, which causes failure of the following crop. It is not uncommon for this to happen when a nearly ripe crop of rye is turned under. A legume crop, on the other hand, containing a higher percent of protein and a lower percent of carbohydrates carries with it more than enough nitrogen for its decay, and this excess becomes available to the following crop.

The amount of nitrogen added when a legume is turned under depends on the kind of legume, the thickness of the stand, and the stage of growth at which the legume is turned under. The top part of a legume plant has about twice as much nitrogen in it as does the underground portion. When turned under as green manure, a legume adds to the soil only the amount of nitrogen it has taken from the air.

There are other factors determining the crop to be used for green manuring besides the amount of organic matter and nitrogen. One of these is the time when they least interfere with the regular cash crops. In the South, winter cover crops are used and turned under in the spring as green manure.

Each user of green manure crops should bear in mind the fact that when large quantities of green organic matter are turned under the soil, some time must be allowed to elapse before planting a succeeding crop. This lapse of time avoids injury by decomposition products to the seedling of the crop to be planted.



The use of "home-grown" fertilizer—green manure crops—improves the soil





# Beyond the Horizon...

**E**ACH new year brings a new horizon, beyond which are concealed the realities that materialize or shatter our hopes, our dreams, our visions. It is this mystery of the future that adds zest to living and spurs man to new achievement.

In 1837, John Deere caught a vision of a better plow to turn the stubborn soils of the new west. He dreamed, he hoped, as his anvil rang day after day, night after night. Success greater than his fondest hopes lay beyond the horizon for John Deere, the blacksmith of Grand Detour.

Today, the great organization that bears his name looks forward to new horizons, to new achievements in the creation and perfection of equipment that makes life easier and more profitable for the man who tills the soil. Its twelve great factories with thousands of men, and its sales organization that spreads around the world are a living tribute to the man who saw beyond the horizon of 1837.

JOHN DEERE • MOLINE, ILLINOIS



# Oddities of Agriculture

BY EARLE C. TRUETT, Jr., '41

Did you ever stop to think that a one-cent postal card may bring to you from your agricultural college publications worth hundreds of dollars toward better farming?.

Over 4,000,000,000 feet of lumber and timber products will be necessary to fill the requirements of the National Defense program during the next 17 months.

We should also say, blessed are the terrace makers because they shall be called the saviors of the soil.

Did you ever see a field walking? Well, you've seen it running down muddy streams, and that's more frightful.

Wise land use has a moral and spiritual value. Soil conservation gives new life to rural communities and their churches.

Did you know a cow requires about an hour to eat enough grass, and regrind it suitably for assimilation to produce one quart of milk?

It is estimated that if a laying flock is to make a reasonable labor income for its owner, the hens should lay an average of at least 150 eggs each year.

It is true that good farm buildings are another thing that don't grow well on poor land.

Damage to cotton bales, unprotected from the weather this winter, estimated at \$5.00 per bale, will cost the Southern farmers a lot of money, practically all of which could be saved.

In the book of successful farming, there will be many legume leaves.

When the farmer's dollar goes to town, business picks up, wages rise, jobs are created and dollars multiply.

Just a little traveling on the Great Plains of the west makes you realize how blessed is a land like the Southeast with ample rainfall.

Because hogs do not perspire, they suffer from heat more than other domesticated farm animals and therefore need plenty of shelter and fresh water.

Two good reasons for painting are: It adds beauty to the building, and also paint gives protection from weathering and this adds permanency to a structure.

Rotten manure, entirely decomposed, makes a swell mulch for the bed of perennial flowers after the stalks have been cut and removed.

The strangest experiment directed toward the alleviation of the boll weevil menace is to be seen at the Delta Experiment Station at Stoneville, Mississippi. Weevils take to their heels in consternation as a gadget with bells on it is started to jingling. The affair is built so that when a small motor is turned on, a bell is hit swiftly by rotating clappers, making a long jingling noise.

There are more students in the colleges and universities of the United States than in those of all the rest of the world put-together. Americans are by far the best educated, best housed, best clothed, best fed people in all the world. May it ever remain the home of the free and the brave.

High quality and low prices are never found together in the same bag.

A new vaccine for hog cholera contains no disease producing virus and does not require the costly serum dose.

Farm population has increased two million in the last decade.

Germany has grabbed Jersey, Guernsey, and Holland the home of the Holstein. After the war Europe may have to come to the U. S. to replenish its stock of purebreds.

In the first draft of Stephen Foster's immortal "Old Folks at Home" he used the name "Pee Dee River"; therefore the Pee Dee almost became world-famous.

Cotton farmers of S. C. should be congratulated on producing a 372 pound average on 1,235,000 acres. It took not only ideal weather but mighty good farming for the South Carolina cotton growers to make this amazing record.

Pruning can be done any time from Nov. to April. Tools ready?

Oyster shells supply chickens with calcium—but they're not a substitute for grit. They quickly dissolve in digestive juices, and have little, if any, grinding value.

M. L. Wilson, a director of Extension work says, "Food and nutrition are very vital things in defense and war activities."

I'm just beginning to learn that I can use my land for profitable production and conserve it, too.

We all should agree that whoever saves a field from erosion's frightful waste is doing a service to posterity.

There are millions of acres of idle land in the Southern States that should be producing at least 250 board feet of pine timber a year.

Sad but true—the only running water in many farm tenant houses is that which runs through the roof when they leak.

A pathetic little feature of the coming winter rains is the huge amount of soil that will go down the creek from fields not protected by terracing and other soil-conservation practices.

Americans eat an average of about 1440 lbs. of food per person annually, or nearly 4 lbs. a day.

A woodland pasture is a rather poor woodland and a mighty poor pasture.

Many farmers could send their boys and girls to college on dairy cows, if you get what I mean.

— THE AGRARIAN —

Slogan for 1941 farming: Make the farm feed the family.

•

Serving the Peach Growers of South  
Carolina, Marketing Peaches and Supply-  
ing Insecticides and Sprays of All Kinds.

**SOUTH CAROLINA**  
**PEACH GROWERS ASSOCIATION**  
**219 Montgomery Building**  
**SPARTANBURG, S. C.**

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**CHAMBERS PRINTING COMPANY**

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**CLEMSON, SOUTH CAROLINA**



## AG. FAIR PREVIEW

continued from page 13

novelty events). There will be ten horse classes and six novelty events.

The horse classes will be as follows: (1) Amateur Three Gaited Horse Class, (2) Horsemanship Class, (3) Five Gaited Class, (4) Road Hack Class, (5) Walking Horse Class, (6) Young Ladies Horsemanship Class, (7) Gentleman Amateur Riding Class.

The Entomology Department will have a most educational exhibit. All of the insect pest and wild life of South Carolina will be shown. Different means to combat pests will also be demonstrated.

Dr. Lease will have a complete array of crystal vitamins and their functions in the human and animal body.

Due to incomplete plans the Agricultural Education Department has not announced the nature of their exhibit.

We, the Agricultural and Agricultural Education students of Clemson College, present this Ag Fair to show you the progress we are making. Come out, have a big time and see what young South Carolinians are doing.

## FARM MECHANIZATION

continued from page 13

electrically wired fences has, to a large degree, taken drudgery and labor out of farm tasks. New 1/4 to 1/2 horsepower electric motors are being used on the farm for grinding small grains, with power lathes and saws, and for operation of ventilators in barns for curing hay.

Farm mechanization has come a long way; but it still has far to go. The Southeast is the least mechanized section of the country as to farm machinery; but it, too, is rapidly advancing in all phases of power farming, because it has learned that cheaper and greater production per acre means greater net returns.

THE AGRARIAN

Many of our farm people will sleep much better because of the cooperative mattress making program throughout the South.

THE AGRARIAN

Limestone and phosphate is a powerful grass growing team, according to agronomists.

THE AGRARIAN

A million matches may be made from one tree but one match may destroy a million trees.

### BEST RESULTS — QUICK SERVICE

## GET T. C. PRODUCTS

### MICROGEL

A neutral copper fungicide suitable for mixing with oils. An amorphous powder containing 50 percent copper as metallic.

### TRI-BASIC COPPER SULPHATE

Most widely used fixed copper for spraying and dusting tomatoes, sugar beets, potatoes and other vegetables. Genuine Tri-Basic full 53 percent metallic copper.

### MONO-HYDRATED COPPER SULPHATE

For preparation of copper lime dust guaranteeing full 35 percent metallic copper.

### COPPER FUNGICIDES

Tennessee 26 percent and Tennessee 34 percent. Very successfully used as spray or dust to control fungus diseases of fruit trees and vegetables.

### ES-MIN-EL

A new product combining in one package the essential mineral elements such as zinc, manganese, copper, iron, boron, etc.

### IRON SULPHATE

Iron is one of the most important mineral elements for plant growth. It is easily furnished by use of T. C. ferri-floc.

### ZINC SULPHATE

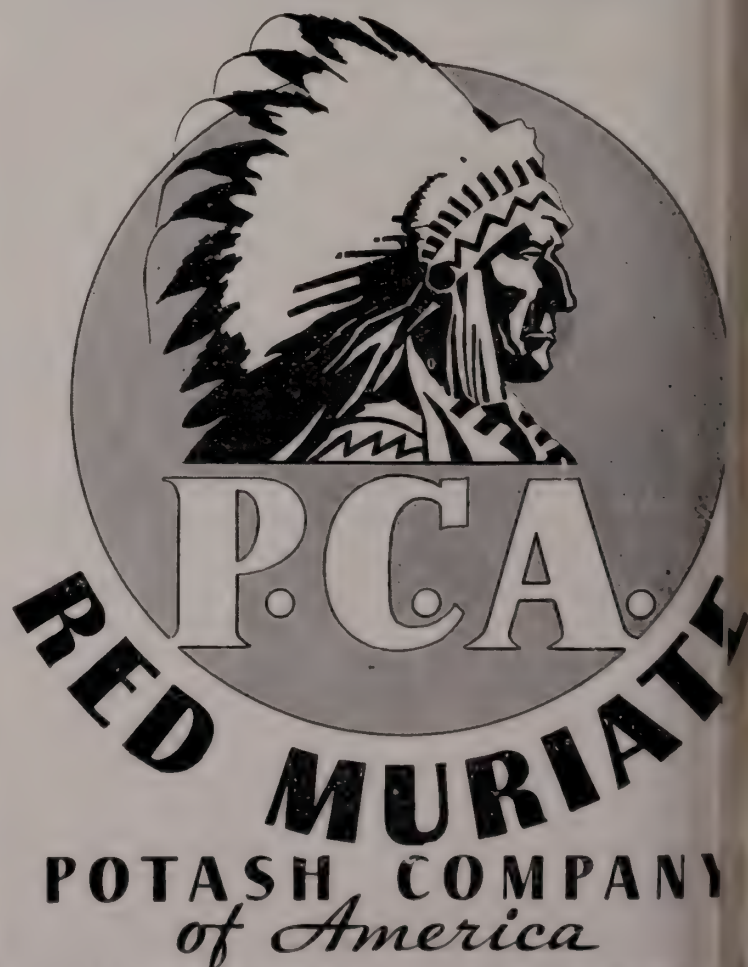
Acts as buffering agent in sprays. Stimulates growth and overcomes certain plant diseases. Completely soluble. High in zinc content.

### COPPER SULPHATE

"Activating" element for copper deficient soils. The product you need for home-made "Bordeaux."

### MANGANESE SULPHATE

Increases yield, improves flavor and shipping qualities. Spray Grade. Lively ground fertilizer grade mixes well with other materials. Easily applied.



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# Soil Acidity and the Southern Farmer

BY L. C. HAMMOND, '42



"Lime—the first step toward more profitable farming in the Southeast."

The southern states make up one of the poor sections of the United States. Why is this statement true? There are many and varied factors which contribute to the general poverty conditions found to exist among a large percentage of the farmers of this section. Erosion, promoted by the climatic and topographic features plus the general ignorance and carelessness of the farmers, has removed the soil upon which our grandfathers made an abundant living. The one crop system of farming has depleted the soil of its fertility and organic matter and has promoted an acid condition. Because of the poor soil, physically, biologically, and in quantity of available nutrients farmers have been forced to use some commercial fertilizers. Without their use in some areas the farmer would hardly be able to obtain a bare living.

In the South the soil acidity problem is receiving much attention. A test of over two and one-quarter million soil samples taken from all over South Carolina revealed that seventy-five percent of the cropland is too acid for a farmer to obtain an adequate profit from his occupation. Only about twenty-five percent of the farmers in this state are making a fair profit and, generally speaking, these live on the twenty-five percent of soils which are not extremely acid. In recent years, pioneers in this field have labored to promote the use of lime to partially

correct this acid condition of the soil. The farmers, however, and even a few agricultural leaders have been slow to recognize the profit to be reaped from its use. In many other states more lime is used than in South Carolina, even where their soils are derived from limestone and other basic rocks. Most South Carolina soils being derived from acid rocks need relatively more lime.

The southeastern states are highest in the total consumption of commercial fertilizers. Superphosphate is used in great quantities either alone or in mixed goods, yet there is commonly a comparatively unequal crop return. The crop apparently does not obtain a sufficient amount of this fertilizer element even though large quantities are applied to the soil. Plants must have phosphorous. Animals must obtain phosphorus from the plants which in turn must get their phosphorus from the soil. A deficiency of phosphorus is shown by the plants becoming very dark green in color, and their failure to make necessary root growth.

The reason for plants not showing a corresponding response for the amount of superphosphate used, can be attributed to the presence of soluble iron and aluminum in the acid soils. These compounds cause the superphosphate to revert into a form which is unavailable to the plants. For many years farmers have been spending money on a costly product used to precipitate the iron and aluminum when a cheaper product, limestone, should have been used. This does not mean that no phosphate should be used. Probably more should be used, but to supply a sufficient quantity to be absorbed by the plant, lime must be used to precipitate these toxic elements. The pH of the soil should be maintained between six and seven for the plants to be able to absorb the maximum amount of phosphorus. The lime, besides precipitating the iron and aluminum by raising the soil pH, has another function furnishing calcium, which reverts the superphosphate to the form more readily available to plants than if the iron and aluminum were allowed to revert to superphosphate as is the case in acid soils.

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# National Defense and Vocational Education

BY S. K. ABLE, '42

To many residents of agricultural districts, as in rural South Carolina, the defense program of the United States is an abstract quantity which affects them remotely. They are anxious to serve their country, but feel that their capacity is limited because of lack of training and the absence of defense industries in their district. However, in the vast program now underway in America there is a place for everyone. Each citizen has allotted to him a place for service. His duty is to find that place.

To assist the citizen in finding his niche, the government has set up an organization whereby every citizen in the community may have a part in the preparedness program.

One of the most serious bottlenecks that has occurred in building up this nation's defense is the shortage of skilled labor. To overcome this shortage, "Pre-employment Courses for Defense Training" have been set up under the direction of the State Board of Education. Under this department, the local teacher of vocational agriculture has been made the organizer and supervisor in his community. His job is to prepare a course of study, secure competent instructors and maintain high standards of learning. He also has the responsibility of obtaining the approval of the local school authorities, securing classrooms and checking the available tools.

A number of courses of instruction are offered. Among them are the operating, servicing and repairing of motor vehicles, metal work, woodwork, elementary electricity and related subjects. These subjects are the ones in which a shortage has occurred or will occur in an emergency. The organizers do not attempt to make artisans in the short time given to these courses, but do try to present a thorough, basic knowledge of the subject from which foundation the trainee may advance to the more complicated vocation. In other words, these courses of study are introductions to advanced work.

When the teacher of vocational agriculture completes his outline of the course and gets it approved, he looks about for a competent instructor. This instructor is a specialist in his field and the training he gives is practical in its application. He is employed in the field in which he expects to teach and obtains a leave

of absence from his employer. The government pays him a salary during the period of instruction.

Who is eligible for participation in the pre-employment courses for defense training? The application must be an "out-of-school" boy, of high mental caliber and good moral character. He must be industrious, because the greater portion of instruction is actual work on the subject being studied. For example, in the course on motor vehicles, the class will take the vehicles apart and rebuild them. Repairs must be made on the various machines. So we see that to take advantage of this program, the participant must be willing to toil and sweat, but he will gain practical knowledge and experience which will prove invaluable to him in later life.

This great program that has been so recently inaugurated is a character building program as well as a defense program. It was conceived by and is being carried on by patriotic men who deserve great credit for their untiring efforts in its behalf. These men are serving without pay, shouldering their increased burden without flinching. Their efforts will be rewarded not only by a better defended America, but by an America better prepared to weather future storms because of stronger characters and citizens better prepared to take their useful place in the community.

— THE AGRARIAN —

"The soil is good to be born on, good to live on, good to die for, and good to be buried in."  
James Russel Lowell.

— THE AGRARIAN —

Traffic sign in Pennsylvania village: "Slow. No hospital."

## "THE SOUTH'S OLDEST NURSERY"

has a full line of fruit trees and  
ornamental plants. Established 1856.

## FRUITLAND NURSERIES

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AUGUSTA, GEORGIA

## SOIL ACIDITY AND THE SOUTHERN FARMERS

continued from page 29

The farmer must face the problem. Many are working and studying to help him, but he must do his part. Crop yields are decreasing and yet a great percentage of the farmers day-dream and slip further and further into utter poverty and ignorance. Living standards are already low as costs to grow crops frequently exceed returns. Poverty results in crime, disease, and poor health.

What should be done? The cropping system must be changed to control erosion, soil must be properly cared for by the addition of organic matter and lime, and fertilizers must be used as needed. The use of lime will solve many problems which have resulted from soil acidity. Dr. G. H. Collings, Professor of Soils at Clemson College, says, "For the Land's Sake, lime!"

Of course the farmer cannot expect all his problems to fade with the use of lime. This is only one of the controllable factors which the farmer can take in hand and by so doing make his profession more successful. Some farmers have chosen their farms unwisely and are now tied to a farm on which no one can make a profit, and on which he is doomed to slave his entire life for a bare living. Many farmers in the southeastern states live on such farms, however, the majority live on farms which can be greatly improved through the proper use of lime and fertilizer.

— THE AGRARIAN —

The Greek gift-horse idea still works. The budding dictator always seems a deliverer if he offers something for nothing.



**There's a V-C FERTILIZER**  
for Every Crop on Every Farm  
**VIRGINIA-CAROLINA CHEMICAL**  
**CORPORATION**  
Columbia, S. C.

People may be grateful; but if you aren't the kind of person they naturally like gratitude can't make them like you.

## THE CLEMSON DAIRY DEPARTMENT

**PRODUCE**

QUALITY MILK

**MANUFACTURES**

SUPERIOR DAIRY PRODUCTS

**SOLICITS**

YOUR PATRONAGE

YOUR CROP DESERVES THE BEST—  
USE

# AGRICO

THE NATION'S LEADING FERTILIZER



AGRICO Is Manufactured Only By

**THE AMERICAN AGRICULTURAL**  
**CHEMICAL COMPANY**

Columbia • Charleston • Spartanburg



## BIRD BANDING AT CLEMSON COLLEGE

continued from page 11

land Yellow Throat, Meadow Lark, White Eyed Vireo, White Breasted Nuthatch, Coot Baltimore Oriole, and Ruby Crowned Knight.

Larger birds of which no repeats have been sent to Washington are Mallard—9, Black Duck—3, Great Horned Owl—1, Black Vulture—2, Copper Hawk—1, and Red Tailed Hawk—1, Making a grand total of 6,468 birds of 58 species. Returns sent to Washington total 374 and are of 18 species.

This list of species leaves a lot of gaps to be filled to make any approach to the list of birds that have been observed. The land birds, not Passerine, seen at Clemson number 37. The Passerine group observed total 108. Of this latter number 33 are Warblers. They are not attracted to the ordinary baits of bread crumbs and corn used in catching those birds listed, but are drawn by rippling water. This calls for quite a setup and we have not made any special effort to catch them as yet.

The usual bait is bread crumbs and scratch feed, as most of the common birds will come to this bait. The cardinals, however like cracked corn and the sparrows, chicken mixtures. Most of the birds, especially the wrens and the sparrows come again and again and do not seem to mind being caught. The presence of the traps seem to encourage the numbers of birds in their immediate vicinity, drawn of course, by the supply of food. We have not been banding long enough to present any conclusions derived from the data obtained, but hope to do so at some later date.

THE AGRARIAN

## CHOOSING A FARM

continued from page 12

on such land into conditions of poverty. Poor, eroded and steep land cannot be combined with good factors to obtain the most desirable living. If the soil is lacking in any essential of fertility, physical properties, or biologically, the returns will not be as good as they would otherwise be. The farmer should observe the growing crop, which will help to determine the productive capacity of the soil. No farm should be purchased until the farmer, through a thorough study of the soil depth, drainage, susceptibility to erosion, and its content of lime, phosphorus and other fertility elements, is sure that with good soil management and good farm practice he will be able to bring the producing capacity of the soil

high enough to combine with other good factors to make a desirable farm on which to live.

Poverty conditions and failure are sometimes the result of an insufficient amount of acreage in the farm. A farm which is too small for the introduction of labor-saving tools causes the farm laborers to compete vainly with the more productive labor of farmers who are better equipped. The farm should be large enough to keep the farmer occupied throughout the year. Where specialized crops are grown such as cotton the farmer is idle throughout the winter months. The managing ability of the farmer, is also very important in considering the size of the farm.

The prospective buyer will receive his first impression when he sees the farm house and the surrounding buildings. Usually these will serve as an index to the success of the previous farmers. This is not always true, however, because some farmers are better managers than others and may have a greater appreciation for a beautiful house and for good barns and other buildings. Other farmers have spent a fortune at the outset on a good house and barns, but have treated the farm in such a way that the productive capacity is no longer high. The increased outlay of cash necessary to bring a dilapidated house, surrounding buildings and landscape into desirable living conditions must be considered by the prospective buyer. If a good home is found in a community where all homes are painted, up-to-date, and well kept, this is a good indication that the community is a thriving one.

Prices on farms are sometimes not the real value, but are speculative. A farm bought at a speculated price may be in such an area where the real value is low and the farm cannot be sold again thus forcing the farmer to live on the farm for the rest of his life. Many farmers have been tied to an unproductive farm where they have slaved their entire life and yet have been unable to approach a desirable living.

Experience and some knowledge of farm management, an understanding of the principles of plant growth, feeding and care of animals and the maintenance of soil fertility are valuable assets to the person selecting a farm. The farmer should consider all these factors and be absolutely sure that he is not buying a place on which there is some hidden factor which will cause other favorable features to be of no value in producing a desirable living for the farm family.

## AIM OF VOCATIONAL AGRICULTURAL EDUCATION

By TAFT SHERMAN

The main aim in Vocational Agriculture is to teach or train present and prospective farmers for proficiency in farming. We should not only be interested in one farmer, but the community as a whole. The development of the individual is another important objective. Each individual should be interested in his practice program, and he should make it his point to learn something. He should also set a high ideal or goal and strive to reach it to the best of his acquired and growing ability. The student should learn to appreciate his home conditions and farm life in every way possible. He should realize the importance of his work; therefore, his attitude should be good. Vocational Education can also help a lot in cooperative aims of the community. This aim helps in the process of bringing the farmers together for social life and better understanding of each other. When the farmers understand each other they can cooperate better to carry out business deals that will save them hundreds of dollars in the long run. The aim of Vocational Agricultural Education is not merely of business concern, because it helps in every way possible for the farmers and farm boys to have some recreation and have better and more understanding love of farm life conditions.

## ELECTRIC HOTBEDS

continued from page 9

duce the amount of electric current used for heating the beds. The five conditions listed below represent ideal conditions for the location of the beds. The first two are the most important.

1. South slope protected from winds as much as possible or south side of building. (This affords maximum sunshine and heat.)
2. Well under drained soil. (Effective control of soil moisture. Wet soil requires more heat.)
3. Bed should extend East and West and tops or covers should slope to the south in order to get a maximum amount of sunlight.
4. Easily accessible to farm house and buildings.
5. Nearness to good water supply.

The use of the electric hotbed on the South Carolina farm is still in the experimental stages, although great progress has been made. The tobacco belt offers a great field for the use of electric hotbeds and in some cases they are being used now. Mr. S. W. Epps, County Agent of Dillon County was very well pleased with the results he got from his electric tobacco bed last season. The rapid extension of the R. E. A. lines together with the advent of cheaper heating cable, should cause a very marked increase in the use of electricity in the propagation of plants.

THE AGRARIAN

## BLUE MOLD OF TOBACCO AND METHODS FOR ITS CONTROL

continued from page 8

not have to be repeated every night, and it seems to cure the disease after the plants are attacked. Therefore, application does not have to be made until the disease is seen on the bed.

A more thorough knowledge of this disease and its control may be worked out in the near future as it can cause serious loss to the tobacco grower.

THE AGRARIAN

J. G. Lewis, who is now the Superintendent of Education in Aiken, graduated from Clemson College in the class of '23, receiving his B. S. degree in Agronomy.

THE AGRARIAN

Palestine, which has the only commercially developed source of potash in the British Empire, is rapidly increasing its exports of potash and bromide.

You Can Depend on

### WOOD'S TOBACCO SEEDS

BECAUSE



1. Grown under the supervision of a leading tobacco expert, and,
2. Treated to prevent many tobacco diseases.

Improved pedigreed strains of all standard varieties. Packet, 10c; 1 oz., 50c; ¼ lb., \$1.50; 1 lb., \$5.00—Postpaid.

Write for FREE illustrated Tobacco Circular

Oldest and Largest Seed House in the South

**T. W. WOOD & SONS**  
Richmond, Va.



# Farm Buildings in South Carolina

BY F. M. JOHNSON, '42

The need for improvement of farm structures in this State is prevalent. In the past decade farmers have concentrated all their efforts toward maximum crop production. In so doing they have neglected the upkeep of storage space for feed and animals and their homes. Grain losses in South Carolina in one year are five to ten times the cost of adequate storage buildings. Is that good policy? Any work to improve the soil and increase crop production is futile if the crop is lost after it is produced.

The average value of all buildings per farm in South Carolina is \$754.00. This compares with the United States average of \$2059.00 per farm. Yet South Carolina has 3,600,000 acres of woodland. This is far more than enough to repair and rebuild all farms in the State.

However, the average farmer does not have the income or ability to design, build or repair his buildings. The income of a farmer averages about fifteen cents per hour and carpenters demand from fifty cents to one dollar, and the farmer cannot afford to pay this difference. The greatest need today is for rural education. The man of today living on a farm does not realize the need or value of paint. Nor does he know when or how to apply it. He also needs complete designs showing all details for each type of farm building and training in the construction of simple buildings.

The Agricultural Engineering Department of the Clemson Extension service in the past years has been rendering commendable service in this field. Models and exhibits of all build-

ings have been demonstrated in all parts of the State and have proved to be the most successful way of promoting this program. Below is a table taken from the Extension Report of 1939 showing the number of each type of building built through the aid and advice of the extension service in that year.

Type of Building	Number
1. General Purpose Barns	53
2. Dairy Barns	44
3. Hog Houses	160
4. Hog Self-feeders	322
5. Poultry Houses	347
6. Brick Brooders	307
7. Tobacco Barns	94
8. Trench Silos	51
9. Box Silos	10
10. Potato Houses	159
11. Misc. Buildings	689

The United States Department of Agriculture through the Federal Housing Administration has also helped to promote this program. Through this association many farmers have built comfortable, but inexpensive homes. The Administration visualized the effect of economy and designed small, roomy, useful, and economic buildings for rural use in this section of the country. The average cost of a home built through the Federal Housing Administration last year was about \$1400.00.

The work that has been started has only benefitted a small number of the farmers in this State. However, through the cooperation of the Extension Service and the Federal Housing Administration South Carolina can again have adequate farm building.

— THE AGRARIAN —

Cornell University has just sold an All-American world's record cow, which is the daughter of another All-American former world's record cow.

— THE AGRARIAN —

No hope of profit, no investment; no investment, no employers; no employers, no employment.

— THE AGRARIAN —

Erosion removes more than 20 times as much plant food as is removed by crops.

— THE AGRARIAN —

If you think politics is easy, try standing on a fence while keeping one ear to the ground.



Good farm buildings increase farm value.



# Remarkable Improvement in growth of SUMMER LEGUMES



## ...with the use of **TENNESSEE BASIC SLAG**

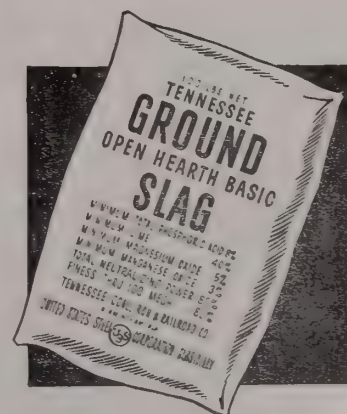
**L**OOK at the picture above. Notice the rich and full-grown foliage on the cow peas at the right. And notice the poor growth at the left. One thousand pounds of Tennessee Basic Slag per acre made this vast difference in cow pea growth on the farm of D. W. Alderman & Sons, at Alcolu, South Carolina.

Here is proof that Tennessee Basic Slag stimulates growth in legumes. Provides those two elements so important to vigorous legume growth — phosphorous and

lime. In addition, Basic Slag contains manganese oxide, iron oxide, and other minor elements.

Basic Slag has proved a valuable soil builder. It improves pastures and provides minerals that help produce beef faster and increase milk production. And it increases yields of grains, cotton, sugar cane, truck crops, peanuts and fruits.

Get the facts about Basic Slag. Ask us for a free copy of our booklet that tells when, where and how to use Basic Slag.



State Distributors: Epting Distributing Company, Leesville, South Carolina



### WHY KEEP BEES?

continued from page 5

Carolina, there being five queen breeders in the state. These raise from a few hundred to eight thousand queens each per year. In 1936 this business produced and sold 104,600 queens for \$59,000. This business is for raising queens for honey producers only; the package bee men raise their own queens.

Another phase of beekeeping which is more or less a part of the honey producing phase is migratory beekeeping. Beekeepers take their bees around to the best surroundings for producing a good honey crop. One beekeeper for example raises his bees here in this state and transports his bees to catch the honey flow in Ohio.

Due to South Carolina's being so fortunate in having such a few bee diseases, the beekeeping industry is getting a foothold faster than it ordinarily would. Numbers of farmers have become acquainted with the commercial phases of beekeeping and the opportunity it provides of making some ready cash.

— THE AGRARIAN —

### GOOD LAND MEANS PROSPEROUS FARMING

By GILBEART H. COLLINGS, Professor of Soils

continued on page 6

brought about twice as much per bushel. Most farmers plant 20 to 30 acres of soybeans. The soybeans are usually combined and in many cases the straw is left on the ground.

Poultry flocks on the average farm are small and in some cases non-existent and the same thing is true of gardens and orchards. Most farmers keep from three to six head of dairy cattle and the milk that is not consumed by the farmer's family is sold to a creamery. Regular milk routes are maintained by local creameries through the community. On many farms no attempt is made to manufacture butter.

The horse is fast disappearing in this community and mules are seldom seen. Twice during my stay I was on farms on which threshing operations were in progress and a horse was not in sight. The racks of grain were brought in from the fields by tractors. While this was no doubt an exception to the general rule, it does emphasize the extent to which some of our American farms have become mechanized.

Most of the breaking of land is done in the spring rather than in the fall. Oats are planted about the first of April, the planting being done with an end-gate seeder, at the rate of three bushels per acre. The oats are then cut in. The

crop is harvested about the first of August and this year most farmers were making between 58 to 68 bushels per acre. One farmer told me he made only about 48 bushels but another said his yield was 84 bushels. Most farms appeared to have about 60 to 90 acres in oats. Many farmers combined their oats, but this is not a popular practice among those farmers who desire to use their straw for bedding. Oats were threshed last August for 2.5 cents a bushel and what wage-hands were available were being paid \$3.00 a day.

Corn, in most cases, is planted in check rows, although a few farmers have begun the practice of planting on the contour. Many farmers are planting corn with four-row planters and most farmers "go through" their crop four times. Although most of the corn harvested will be picked this year by hand, two-row tractor-drawn pickers are rather common. These pickers will pick from 15 to 18 acres a day. Most farmers were expecting a yield of around 75 bushels of corn per acre and most farms had around 100 to 130 acres in corn. At present prices the gross income from corn on one of these farms is, according to our South Carolina way of thinking, extremely good. It should not be overlooked also that these farmers do not have a fertilizer bill to pay.

Throughout the area are many small towns that are made up almost entirely of retired farmers. This is a breed of farmers almost unknown in South Carolina, although we have, no doubt, many tired farmers. In many cases the older couples have moved to town and have turned over the operation of their farms to their grown children.

From what has been said it can readily be seen that these people are not interested to any great extent in a "live-at-home" movement. However, it is not to be expected that a farming people of their income level would take any other attitude. These farming people have a great deal of leisure time, for the mechanization of their farms has reduced by more than a half, the time and effort formerly demanded for the production of their cash crops. The income from these cash crops allow a standard of living not seen in many farming communities of America.

Such a standard of living could only have been made possible in an area of fertile soil, and had we, in South Carolina, been so bountifully endowed with a rich soil, we too, no doubt, would have a like economic background and a like standard of living



# About This and That . . .

BY THE EDITORS



## AN AG FAIR AT LAST

Again the students and faculty of the Clemson Ag School have taken a forward step. This time, it is the presentation of an agricultural fair, long advocated and much talked of, never actually carried out before.

The fair will serve one of the crying needs of the schools—specifically, that of showing the people of South Carolina, and those who are interested in Clemson, exactly what is going on and what is new in the business of making progress toward a more profitable agriculture. It will prove that we aren't loafing on the job here, and that we are working for a GREATER CLEMSON and a FINER SOUTH CAROLINA.

The exhibits sponsored by the various departments are indicative of the traits of initiative and independence which a show of this type develops, and we of the staff feel sure that the positions of responsibility will be amply filled by those in charge of the fair development.

As the date for the exposition approaches, THE AGRARIAN wishes to express its sincere best wishes for the success and permanent continuation of the project, and once again to heartily endorse the first Clemson Agricultural Fair.

THE AGRARIAN

## THE COVER

The pictorial map of South Carolina as shown on the cover of THE AGRARIAN this month, effectively illustrates the distribution of the types of farming as carried on in this State. Diversification is not evident to a noticeable extent.

Several of the counties, in spite of adverse weather conditions and undesirable soil types, could certainly make a better showing in comparison with others if a genuine effort were made. So it is up to the individuals themselves to take advantage of the facilities at their command—the help and advice of the Extension Service and the Experiment Stations, the aid of their County Agents, the recommendations of the state college—to bring the agricultural standards of their respective counties on a par with the

rest of the State. There's a challenge—and THE AGRARIAN believes that because it MUST BE MET, IT WILL BE MET.

THE AGRARIAN

## WHAT ABOUT JOBS?

Because of the rapidly expanding defense program of the U. S., there is a great need for skilled workers in practically every field, particularly in defense industries. Therefore, now is the time for students to apply for jobs if they have not already done so. The demand is far exceeding the supply, and on the basis of hiring because of necessity it's going to be "first come, first served."

With conditions as critical as they are now, THE AGRARIAN sees no reason why every Agricultural student who will graduate in June should not be placed before he receives that diploma. Of course, a certain percentage will be called into the army immediately upon graduation, but for the remainder opportunity is knocking louder than it has in many years and we should certainly "grab while the grabbin' is good".

THE AGRARIAN

## FARMS DEFEND AMERICA

Our farms must be kept up. In this critical period of political and economic unrest, with the world at war with itself, there still remains one country as yet untouched by the hand of Wars—America. And the only way to keep it that way is by an active defense here at home.

Even as we fight "fifth-columnists," and combat sabotage and espionage, so must we fight the tendency to allow the farms—the backbone of a home-loving people—to deteriorate. Production must be kept up, and if armies travel on "their stomachs," then our army will have to be the best-fed in the world.

The draft is taking our young farmers, others volunteer; we must guard against the desire to leave the farm, for some of us must stay at home. We must not allow our country to fall under dictatorship, and the farms are our first line of defense in our fight to preserve Democracy and the rights of man.



# Nitrogen Factories on the Farm

By J. H. GRAHAM, '42



Legumes, the Farmers Fertilizer Plant

Nitrogen is the most expensive element required for plant growth when secured commercially. Consequently most farmers have been waiting for the nitrate manufacturer's to reduce the prices. Other farmers have located nitrogen factories on their own farms in the nodules on the roots of legumes. The microscopic bacteria, the factory workmen, have the job of converting the raw nitrogen of the air into a simple form which the plant can use, and they do this work without any charge. As one writer said, "They not only work for nothing and board themselves, but they pay for the privilege."

To have an efficient factory the host plant must be inoculated. It has been found that not all legumes are inoculated with the same species of legume bacteria. All of the different species of legumes which are inoculated by a single specie of legume bacteria form what is called a cross inoculation group. There are eight such groups.

Soil may be inoculated by two methods: By the transfer of soil from a field where the same legume or a legume of the same species has previously been successfully grown or by the use of pure culture preparations which are on the market.

Two general procedures have been followed in making the soil transfer. Four or five hundred pounds of soil taken from an old field is scattered and harrowed into the soil. The second method is to mix several quarts of composite soil in a paste with water. The legume seed are then well coated with the muddy water. The principle disadvantages of the soil transfer method are: uncertain that there are sufficient nodule bacteria in the soil to give good inoculation and that the ones which are there are of the desirable type. Furthermore, very often insect pests, weed seeds, or plant diseases are transferred with the soil.

Due to the many disadvantages of the soil transfer method, bacteriologists soon began to cultivate the nodule bacteria in the laboratory and to use these cultures for legume inoculation. Lacking knowledge of the growth and properties of such cultures, the success obtained was very variable during the first few years. Great progress has been made along these lines, and at the present time very efficient cultures are on the market which are moderate in price.

Inoculation not only increases the crop growth and yield, but the quality of the crop is improved. The plant contains an increased amount of protein and nitrogen.

It has long been recognized that legumes growth in crop rotation make the soil more fertile for the following crop. A good growth of legumes adequately inoculated will fix approximately ninety to ninety-five pounds of nitrogen per acre a year for the subsequent crop.

The use of legumes for green manure in the cotton belt has greatly increased in recent years. Erosion and leaching of the plant food are decreased. The physical conditions of the soil is not only retained but improved.

The farmer who has an efficient nitrogen factory on his farm thus has access to an unlimited supply of nitrogen for the production of superior crops and the building up of the fertility of his soil.



## A WELL NOURISHED SOIL PAVES THE WAY FOR A WELL DEFENDED AMERICA

continued from page 3

can when starvation for certain plant foods are creating diseases in them. One of the best ways to provide for a well defended America is to have a healthy people; we must provide for them a healthy food and to make this possible and easy—we must first feed our soil.

The armed forces of the United States—admittedly better fed than any in the world—consume vast quantities of food. A well nourished body and an alert mind are of first importance for the soldiers, whether he is drilling or working over blueprints and maps. The army, as a result of years of study, recognizes that in addition to providing calories adequate for his many activities, the soldier's diet must contain minerals, vitamins and proteins necessary for physical well being and maintenance of robust health. The Napoleonic adage that an army travels on its stomach is just as true to-day.

The most vital problem before all nations is not defense armament, but the mineral exhaustion of their soils, and they are faced with the alarming fact that the food being raised on millions of acres no longer contains enough of certain minerals absolutely essential for the best of health of the people. The process of curing sick soils is easier than is the curing of sick people or animals. Calcium, phosphorous, and iron are perhaps, the most important of the major salts regarded as indispensable to the living body; and yet calcium deficiency is almost world wide. Four thousand patients were examined in New York Hospitals and it was found that only two had sufficient calcium. We provide special schools for children who are thought to be backward and stupid; whereas science is proving that many of them are simply suffering from magnesium deficiency. Again we find the underlying cause to be a starved soil.

It is true that we carry tuberculosis and pneumonia germs in our systems, but most of us are strong enough to resist them. However, if something breaks down resistance, the disease germs have their way. So it is with sheep and cattle and hogs. If they were only given their mineral requirements in proper balance, diseases now taking heavy annual tolls will be resisted, because the animals' constitution will be fortified against them. The value of mineral licks is widely known, but licks are not the same as minerals gained from vegetables in organic form. The producer should regard the licks as but a

stepping stone to better processes and prepare his land for growing properly balanced food, working up by gradual stages till he can say all his land is approaching a state of mineral restoration, then will his wool, fat lambs, mutton, beef and milk products, and etc, flourish in high quality and he will find his profits increase year by year.

Another thing that is very important in making possible a well defended America is the maintaining of income. Saving and preservation of soil and maintaining of income run hand in hand. Our farmers lose much money every year because of nutritional deficiencies of their crops, their animals and even of themselves. Therefore we vertebrates, human and animals, are just what we eat.

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THE AGRARIAN

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### Richard Weindling, Ph.D.

Dr. Richard Weindling is a native of Germany. There he received his undergraduate work. He came to the United States in 1929 and entered graduate work at the University of California where he received his Master's degree and Doctor's degree in 1933. He pursued two additional years of post-graduate work at Cornell University.

Since 1938 Dr. Weindling succeeding A. J. Ullstrup, who began the work, has been working at Clemson with the South Carolina Experiment Station cooperating with the Division of Mycology and Disease Survey of the United States Department of Agriculture. His work has been in the laboratory growing cultures of and identifying cotton seedling and boll diseases collected over the entire cotton belt by a co-worker. The main objective of the work has been to determine just what cotton seedling diseases are most frequently found in the cotton belt. Through careful and concentrated effort Dr. Weindling has been able to bring new things to light and to settle many questions. The Anthracnose fungus has been found to be present over all the cotton states east of Texas and Oklahoma. Dr. Weindling says that moisture conditions in parts of Texas and Oklahoma are unfavorable for the complete life cycle of the fungus, therefore accounting for its absence in this area. He has found that the fungus which causes both seedling blight and boll rot of cotton is spread from leaves, trash, and parts of bolls to the seed in the ginning process. Very few of the disease-causing spores were found to be necessary on each seed to cause the seedling blight.



## GIVING THE FARMER A START

continued from page 4

net worth average has been raised (of these families) from \$33.63 in 1935 to a financial level of \$524.98 at the end of 1938. There is an average of six persons in each family. By July 1, 1939 a total of 79.5 percent of all matured payments from the beginning of the program in 1935 had been met by the borrowers. \$40,000,000 was appropriated for the nation for the fiscal year ending June 30, 1940. The farmers pay an interest rate of five percent. Only a small percentage of farmers making application receive loans each year. The average tenant purchase loan of South Carolina was \$3,992 for the first two years, and the average farm size was 120 acres. Each loan provides for improvements; including new houses, barns, terracing, fencing, or other facilities necessary for a well balanced farm unit. The second year of the loans went for improvements, compared with only 18 percent for them the first year. This was due to a scarcity of suitable farms with adequate housing facilities.

These families not only have year round gardens, but also can their surpluses. Many families canning as many as 142 to 159 quarts of fruits and vegetables per season. This being brought about by helping them to get sufficient jars and pressure cookers. In 1935 only 55 percent of them had any cows, only 49 percent had any hogs, and 75 percent had chickens. These subsistence needs are being adequately met under this program. The farmer plants more feed and less cash crop acreage, which enables him to produce more of these needed products.

One of the main features of the F. S. A. is that it is improving the tenure in more than one way. Written leases are being used satisfactorily. Children are attending school more, which is a step toward decreasing our large illiterate ranks. Housing conditions have been bettered by building better ones, through the use of loan funds. At this point it is worthy to note that the Bureau of Home Economics made a survey in 1934 pointing out that it would cost about \$8,000,000 to put all of the farm homes in the U. S. in repair provided all materials and labor costs were secured and hired at prevailing wage rates. The 1930 census showed that all farm houses in the nation were valued at only \$7,083,000,000. This indicates that it would cost nearly as much to put them in good condition

as they were worth. In many cases this problem faced the F. S. A.

By screening houses, providing sanitary toilets, building necessary out-buildings, and obtaining an adequate water supply for each farm unit the thing which is so dear to all humans was reached—better health. Also by cooperating with county medical societies medical service associations have been set up in 16 of our 46 counties. The cost ranging from \$12 to \$16 per year for each family.

Besides all of these monetary gains that the F. S. A. has helped bring about there are an abundance of other improvements which have been listed above which are just as important. In short they are: adequate gardens, more meat, milk and eggs per capita; better workstock with an increase in feed acreage; improved tenure and housing; better school attendance, better health and sanitation. All of these go together to help the tenant to become a progressive self-supporting owner. These factors strengthen the morale of the people and undoubtedly have raised the standards of living throughout the nation and has helped to establish the "live at home program" in South Carolina. This sound program is another step toward national security and defense.

— THE AGRARIAN —

G. O. Hill, an Agronomy graduate of the class of '18, is now engaged in work with tobacco in Durham, N. C.

— THE AGRARIAN —

H. G. G. Hoffmeyer, a graduate of the Agronomy class of '18, is now farming at his home near Florence, S. C.

— THE AGRARIAN —

Some men grow under responsibility, others only swell.

U N I F O R M S

★

WILLIAM C. ROWLAND

★

MILITARY EQUIPMENT





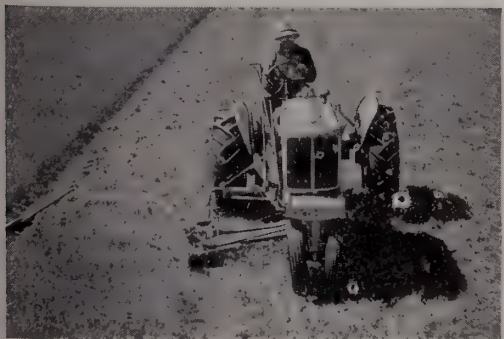
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# CAMEL — THE SLOWER-BURNING CIGARETTE —



# *The* **Agrarian**

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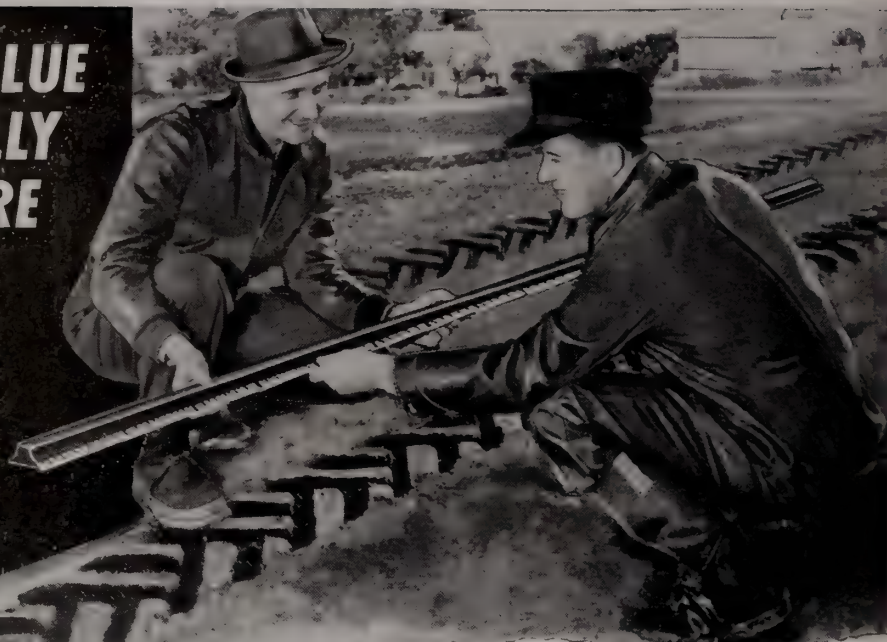
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# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 3



No. 3

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# New South Carolina Agricultural Industry

By S. K. ABLE, '42

*An Industry that is increasing the Piedmont Farmer's income . . . . .*



Courtesy S. C. EXTENSION DEPARTMENT

## A new market for their products . . . . cheese

On August 12, 1940 a new industry which has proven a boon to the dairy farmers of Chester County was opened. This new industry is the cheese-making plant of the Borden Company located on the outskirts of Chester. The cheese plant itself is not an imposing structure, but its backers are enthusiastic and at present the Borden Company is formulating plans for its enlargement and for the shifting over to the making of evaporated milk.

The manufacture of evaporated milk is the ultimate aim for the Chester plant, but lack of milk production has caused cheese-making to be substituted until production can be increased sufficiently. Milk production has already been greatly stimulated, for on the opening date the plant had fifty patrons and covered only Chester County. The number of patrons now stands at two hundred twenty-five and covers Chester, York and Fairfield counties. By next summer the managers hope to begin the development of Union and Lancaster counties into high milk producing areas.

The cheese produced at the Chester plant is the common Natural American Cheddar cheese. Its manufacture is an interesting process, but is little known or thought of outside dairying circles. The milk is brought in from the farm, weighed, tested for the butterfat content and then goes to the Pasteurizer. The "flash method" of Pasteurization is used. In this method, the milk is heated rapidly to 165° Fahrenheit and is then partly cooled. From the Pasteurizer the milk goes at 85° F. into one of the two vats of ten thousand pound capacity. At this time one percent culture is added as a starter. Throughout the first stages the milk is agitated constantly. One ounce of vegetable coloring is added for each thousand pounds of milk. Rennet is introduced to cause the milk to curd more rapidly. When the curd develops it is cut into small cubes three-eighths of an inch in diameter, after which the cubes are stirred for ten minutes. Then the curd is heated to 100°-102° for half an hour in order to toughen

continued on page 32



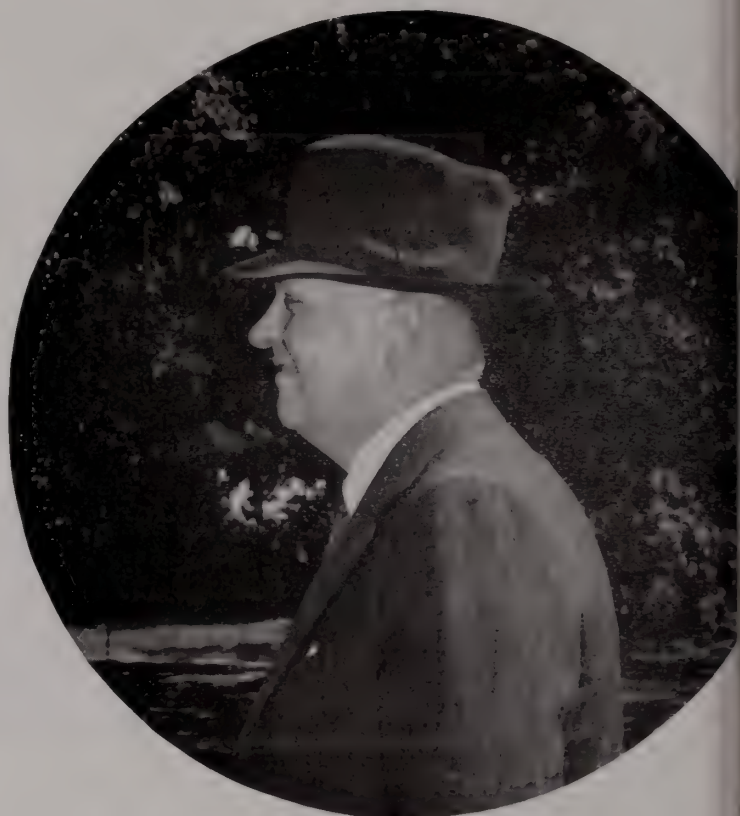
# Looking for New Opportunities in Agriculture

Dr. R. F. POOLE, President of Clemson

Agriculture is the world's most charitable industry. It is the least organized industry and is the only large and important industry in which the producer has no bargaining privileges. It should be classed with the great humanitarian gifts to the world. In this country it is, not only literally speaking but practically too, the life line to the stability of government and industrial wealth. Throughout all times agriculture has been a slave to supply and demand phenomena. Many efforts have been made to obtain for the industry just price values, but satisfactory results seem to be as remotely distant now as at any other time. Until satisfactory and conceivably needed far-reaching reforms can be made, it seems important that growers must seek opportunities existing under the present conditions in order to achieve a successful livelihood. By every known measuring stick the farmer has the right to seek an equitable share of the wealth created through his efforts.

I am optimistic about the future of South Carolina and its agriculture. There will be depressions but there should never be famines unless our people become panicky. The state has many small cities which are fairly well distributed. We have magnificent streams and still have some good forest areas. The good roads, good homes, and good moral standards are worthy of praise. There is also a growing intelligence and a consciousness of educational values among the people in all walks of life in this state. The climate affords pleasant living and a diversity of plant growth. The balancing of plant and animal production, so much needed in the southern states, is rapidly becoming a reality.

The extraordinary evolutionary processes permeating the magnificent agricultural industry are forcing necessary changes. Many of our farmers have met these demands slowly, others have not, and consequently some of them have permitted the vital top soil to wash into the streams. The more progressive farmers have kept pace with and have on timely occasions made adequate adjustments and are farming under more satisfactory conditions. At no other time have the agricultural agencies been chal-



R. F. Poole •

lenged to greater effort toward aiding farmers to make essential adjustments.

Today the farmer is faced with more problems affecting economic production than at any other time. Insects, diseases, insufficient nutrients in the soil, and irregular moisture conditions tax his efforts to the fullest. The cost involved in economic production has been mounting despite the splendid accomplishments in agricultural research in the development of good seed, improvement in fertilizer practices, and development of effective fungicide and insecticide materials. But all of these factors seem- ing despite the splendid accomplishments in agriculture.

The future farmer will ever be conscious of the value of agricultural research. It is the life-saver of the agricultural industry. It is imperative that greater effort on the part of the scientist will be needed to develop plants resistant to insects, diseases, weather, and rapidly

continued on page 30

# Tenancy in the South

By E. P. HUGUENIN, '42

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*This curse which smacks of Feudalism must be removed*

---

It's an easy matter to hastily judge the tenant farmer. The pathetic thing about him is his poverty, and we quickly blame him for it. We indict him for lack of ambition, inefficiency, and having little or no initiative. These are the reasons we say he is poor . . . not because of these failings but in spite of them.

In a certain percentage of these folk, whom we think of when we speak of tenant farmers; they are guilty of having no ambition, and lacking efficiency but even if this is the explanation of their heart-breaking poverty; we couldn't afford to dismiss the problem with just that; it will remain unsolved. It is because of his lack of worldly goods that he has no interest in life and posterity—he's a beaten man from the start. He's mentally, morally, physically and spiritually dead. Tenants are pitiful, soul-saddening creatures of a selfish, cruel civilization that shows them no mercy. Their chance in life is denied them.

We rejoice in the marvelous advance this country has made in wealth, and consequently in its scale of living, and we have a right to our rejoicing. But at the same time it is a deplorable fact that although farming holds such a large place in our national life, the farmer gets so little to live on. The tenant gets even less to live on than the farmer, his plight is saddest of all.

In 1938 the committee that was appointed by the president to study the South as the "Nations Economic Problem No. I," stated in its report that the average tenant family received \$73.00 per person for a years work, and sharecroppers in some cases as low as \$38.00 per person for a years toil. These figures tell an eloquent and tragic story. The average family barely gets enough to keep body and soul together. Comforts, conveniences, recreation, and the things that lift men up are denied them, and



Courtesy S. C. EXTENSION DEPARTMENT

Owned by one of South Carolina's Tenants

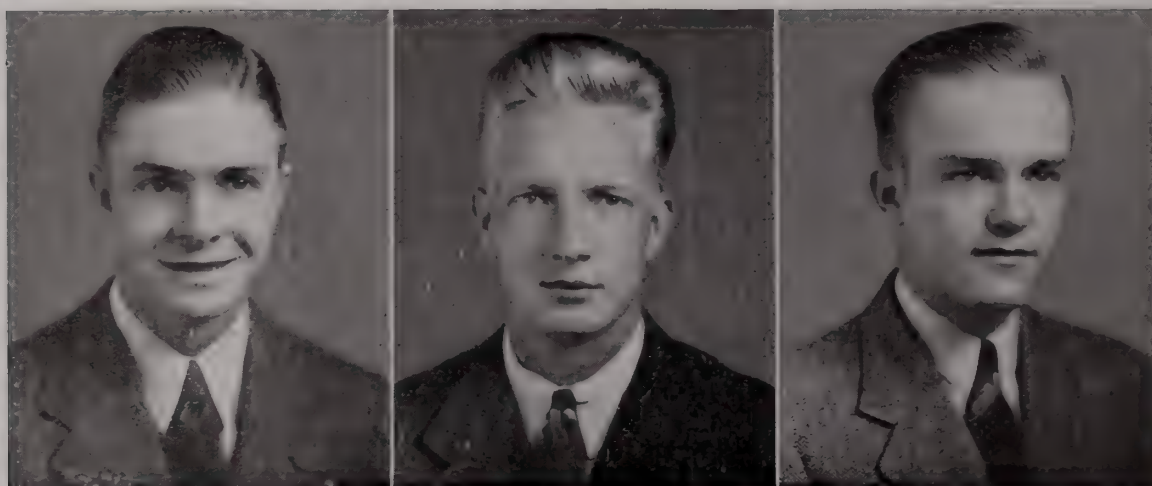
it isn't any wonder that the sodden, dreary conditions in which they live has killed their spirit, and taken away their ambition. The marvel should be if any of these things were present. They can't provide a proper diet for themselves let alone their children. There's no money for a cow, hog, and surprisingly few can even afford chickens.

Something must be done about this important part of our population. Millions of these people are honest hard working folks, who are merely needing a chance and are asking nothing more. All can be lifted to self-respect and self-support if we lend a helping hand.

Cold and heartless self-interest if not human sympathy should prompt us to help these unfortunate people. They are a heavy drag on the prosperity of this country. They constitute fertile soil in which the unscrupulous may sow seeds of discontent, suspicion, hate, and revolt. We must not permit this intolerable condition to exist any longer, we can and we must do something to solve it.



# Agrarian Personalities



FRANK E. ROGERS

Editor-in-chief of THE AGRARIAN . . . . Blue Key . . . . Scabbard and Blade . . . Senior Council . . . Lieutenant Colonel . . . Alpha Phi Omega . . . Gamma Alpha Mu . . . Minor "C" . . . Tennis Team . . . Likes to sleep and talk . . . neat in appearance . . . A.S.A.E. . . . Plans to sell farm machinery after graduation . . . An ardent jitterbug . . . AG. Engineering Major . . . Generally conceded to be the best looking boy on the campus . . . .

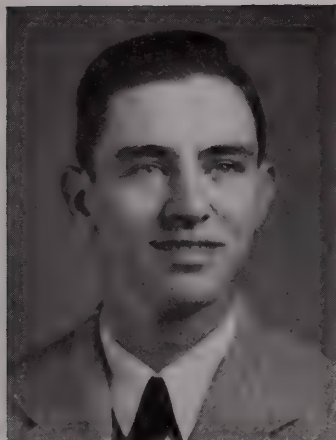
H. C. ZERBST

"Ritzy" Zerbst, managing editor of THE AGRARIAN . . . Blue Key . . . Minor "C" Club . . . Sports Editor of TAPS . . . Head cheer leader . . . Ardent jitterbug . . . Prefers swing and Jimmy Lunceford . . . Enjoys "shooting bull", sleep and sports, especially football . . . Has a decided Charleston brogue . . . Majors in horticulture . . . Cadet First Lieutenant, company executive.

E. L. YOUNG

"Ed" Young, business manager of THE AGRARIAN . . . Member Blue Key, Tiger Brotherhood, Mu Beta Psi, Dairy Club . . . Dairy major . . . Expects to manage dairy after graduation . . . President of Baptist Student Union Council . . . doesn't smoke . . . Cadet First Lieutenant, regimental chaplain . . . Likes Winthrop girls, brunettes and good dancers . . . Plays trumpet in the band . . . friendly . . . studious . . . Saves texts for reference library . . . Member Senior Council . . . Historian of the Senior Class . . . President of the Pedecans . . . .

# Agrarian Personalities



**E. P. HUGUENIN**  
 "Deacon Huguenin", . . .  
 . Associate Editor of THE  
 AGRARIAN . . . Rising Edi-  
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 negie Music Society . Calhoun  
 Forensic Society . . . Dairy  
 Club . . . Bishop Finlay Club  
 . . . Education Major . . .  
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 . Boogie Woogie Music . . .  
 Doesn't Smoke . . . Likes to  
 hunt . . . Hates snakes . . .  
 Listens to classical music by  
 the hour . . . Dignified . . .  
 Friendly . . . Excellent Con-  
 versationalist . . . .



**Z. T. FORD**  
 Sec.-Treas. Kappa Alpha  
 Sigma . . . Alpha Zeta . . .  
 Asst. Circulation Manager of  
 THE AGRARIAN . . . Y.M.C.  
 A. Council . . . Dairy Club . .  
 . . Cadet Lieutenant . . . Quiet  
 . . . Reserved . . . .

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**W. B. NICKLES**

**W. B. Nickles**, Circulation  
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 . . studious . . . Plans to fol-  
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 and redheads . . . . Reads  
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American Dairy Science  
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 ager of THE AGRARIAN . .  
 . . Animal Husbandry Club .  
 . . Block "C" Club . . . Dairy  
 Club . . . Athletic . . . . Out-  
 standing football player . . .



# Silos

By M. E. JENKINS, '41

*An economical method of preserving forage . . . . .*



Courtesy S. C. EXTENSION DEPARTMENT



Courtesy S. C. EXTENSION DEPARTMENT

There are as many different ways for making silos as there are for making houses. But we need consider only a few here for they will fill any requirement. Silos are of two general types, the above ground or upright silo, and the below ground silo which is constructed by digging a hole in the ground.

The upright silos vary from very temporary structures to permanent structures. The permanent silos are made of concrete, brick, or tile. Concrete is the most popular. These are of two style, the solid concrete and the concrete stave. Both are very durable, sturdy, and trouble free. The stave type is usually the most economical to build. Sometimes the cracks between the staves leak when the silage is very wet, especially with grass silage. Silos for grass and legume silage have to be made very strong for these silages exert about twice as much pressure on the walls as corn silage. The acid in silage slowly eats away the walls of concrete silos. To retard this action, the walls of the silo should be brushed clean as the silage is taken out and the walls given a coat of oil. This can best be done every time five or six feet of silage is removed instead of waiting until all

of the silage is removed, but cover the silage with sacks when the oil is applied to protect the feed. Wooden silos are cheaper to build, but they are not as durable as concrete.

Satisfactory upright silos can be made by filling snow fence lined with building paper. This makes a very cheap silo that can be put up anywhere at any time. Many of them have been used with much satisfaction, but a good deal of spoilage occurs in them.

Probably the best temporary silo, and it is not so temporary, is the trench silo where it is adapted. It is best suited to hard clay land where there is a low water table, as in the piedmont.

These silos are easy to make and cost very little. The main cost being labor, and this can be used when there is little other work to be done. There are two objections to the trench silo, there is a large surface area for spoilage, and the trench makes it hard to get out the silage. The surface spoilage can be greatly reduced by making the trench deep and narrow (but make sure the sides will hold or they may cave in with fatal results), and by covering the silage

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# The Farmer's Vegetable Basket

By R. N. GLEASON, '42

*A Balanced Garden . . . A Balanced Diet . . . Better Health*

Approximately eighty percent of all farms in the United States maintain a farm garden. A quantity of vegetables sufficient for a family of five or six and having a market value of \$100 to \$150 can be supplied by a properly cared for half-acre garden. Farm gardens supply vegetables of much higher value than can be bought at most markets. This is true because the produce from the farm garden is available when needed fresh, and has high quality and flavor. Vegetables that are purchased on the markets usually have been shipped long distances or kept in storage and subjected to handling and exposure.

Fresh vegetables, especially the green leafy ones, have a high vitamin content and are a factor in safeguarding the family's health. The farm garden becomes a time-saver during busy periods on the farm when there is little time to be spent going to the market for fresh vegetables. It is necessary that the garden be placed on good soil. One well drained, well supplied with organic matter, retentive of moisture, easy to work, and reasonably free from weeds should be selected if possible. The type of soil is not the most important factor; however, sandy loam soils can be worked earlier in the spring than stiff clay loams, but crops on the clay loams frequently withstand dry weather better than those on the lighter soils.

The garden should be located for convenience both in caring for the crops and in gathering the vegetables. Early crops can best be secured on a piece of land with a gentle slope toward the south or southeast. If the land is not well drained, the addition of tile drains, open ditches, or the loosening of the soil by subsoiling may improve the conditions.

It is best that the garden plot be selected some distance from hedges or trees. They not only shade the garden but compete with the garden crops for moisture and fertility. It is well known that sunlight is a vital factor in the production of vegetables, and for this reason the garden should be situated where it will be subjected to direct sunlight.



Courtesy S. C. EXTENSION DEPARTMENT

The garden should be surrounded by a fence sufficiently high and close woven to keep out poultry, dogs, rabbits, and other animals. Poultry, especially chickens, are a common menace to farm gardens, and if crops are to be grown they must be kept out of the garden. This can be done by fencing the garden or confining the poultry to a definite area.

Rodents, especially moles, are another menace in this section. Trapping and poisoning will help to control them. It has been found that carbon disulphide placed in their "runs" will give temporary relief, and moth balls will also help to drive them off.

Of special importance is the fertility of the soil. Stable or barn lot manure is the best garden fertilizer for most soils, especially those deficient of organic matter. On most soils the first application should be very large, and for following years enough should be added to maintain the fertility. Some crops such as beans and tomatoes do not require as much as others; therefore, the manure should be applied only to that portion of the garden on which crops that require fertilizing are to be planted. Most of the time it is necessary to add 50 to 80 pounds of

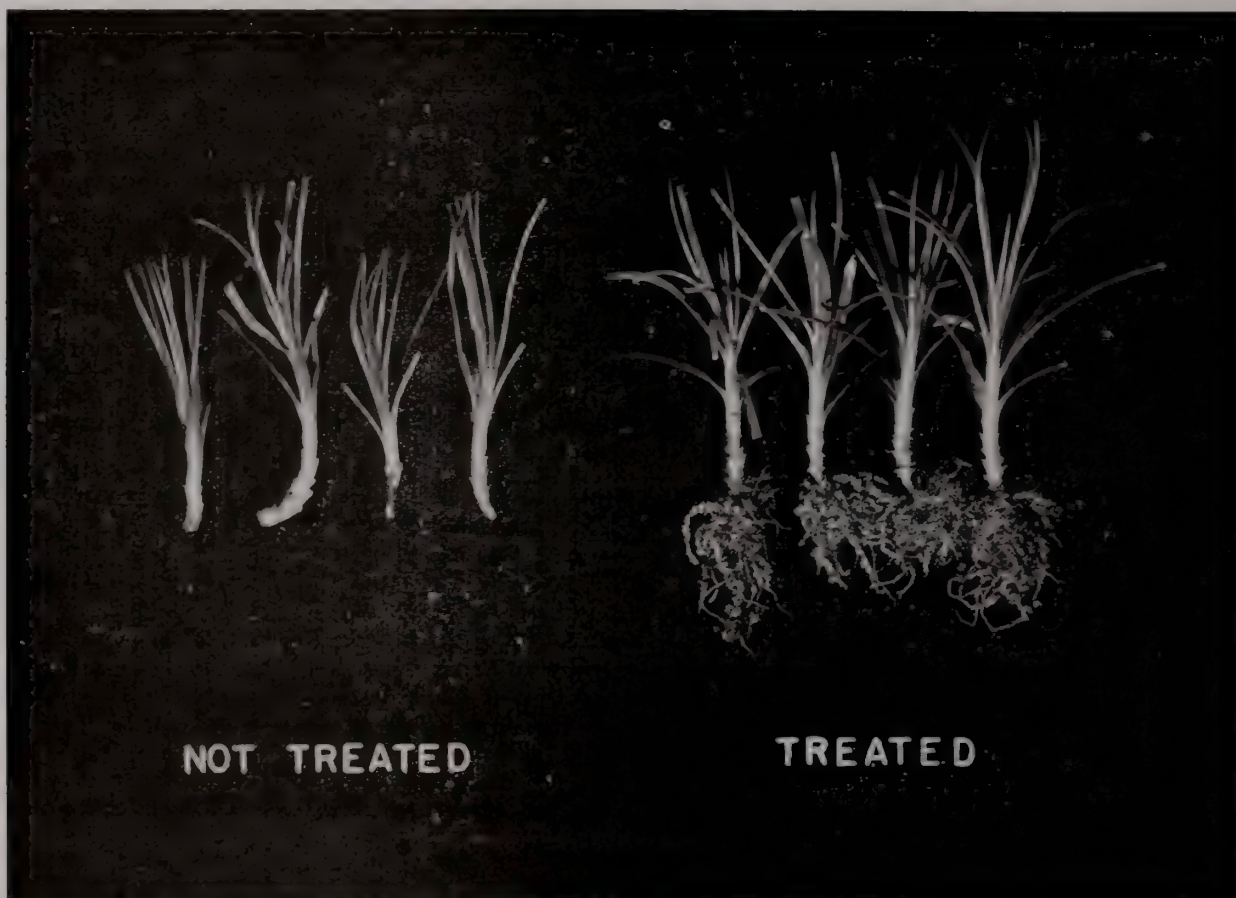
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# Black Magic

By FRED BELL, '43

*Plants fruiting without pollination . . . . . seedless watermelons . . . .*



Courtesy BOYCE THOMPSON INSTITUTE FOR RESEARCH

Imagine plants twice the normal size, roots protruding above the soil on perfectly normal stems, bud inhibition, seedless blackberries, tomatoes and watermelons; also hybridizing plants with 16 chromosomes with a plant that is characterized by 32 chromosomes; no this is not a dream, each is highly possible. All the above is entirely possible, resulting from many years of concentrated chemistry and plant physiological research.

This "Black Magic" is rapidly developing in the fields of chemistry and agriculture. Many authorities may class this work as a study of growth promoting substances, but that remains unseen because this work is perhaps now at the stage of its most rapid development. However, this subject is not really new, as its beginning can be traced to the days of Charles Darwin and his associates.

By painting the proper amount of this growth-promoting substances that contain important plant hormones to the stems of plants, roots have been induced. Hitchcock (1835) and Zimmerman and Wilcoxon (1935) working with intact plants, induced root formation on stems by application of lanoline pastes containing indole-acetic acid and various other substances. Mueller (1935) in very accurate experiments has applied lanoline pastes containing urine, or orchid pollinia, to a number of decapitated plants, and the pastes caused inhibition of lateral bud development. Thus we can say the auxin's process not only promotes growth and organ forming ability, but under certain conditions may also inhibit growth.

Seedless tomatoes have been developed by Dr. Zimmerman at the Boyce Thompson Institute

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# Dairymen---Watch Milk Flavor

C. A. JAMES, III, '43

*Flavor the Difference Between Profit and Loss . . . . .*



Courtesy S. C. EXTENSION DEPARTMENT

Dairy men interested in selling more milk should be vitally concerned with milk flavors. What causes some milk to have a disagreeable flavor? How can this detriment be remedied? These questions will be discussed to some extent in the following article.

A group of milk flavor judges, after testing many samples of milk, compiled a list of detrimental flavors commonly found in milk throughout the country.

acid	dishrag	metallic
alfalfa	fishy	moldy
apple pomace	flat	nutty
beet tops	French weed	off
bitter	garlic	oil
bitter weed	fruity	old
burned feathers	grass	onion
buttery	heated	oxidized
cardboard	irradiated	papery
cheesy (cooked)	medicinal	pasteurized

In reference to feeds which impart objectional flavors to milk, Babcock makes this statement, "Feed flavors and odors in milk are most frequently caused by succulent feeds. When fed to dairy cows one hour before milking, silage made from corn, alfalfa, sweet clover, or soy beans; and green alfalfa, cabbage, turnips, rape, and kale seriously affect the flavor and odor of milk. Green rye, green cowpeas, potatoes, dried beet pulp and carrots affect milk only to a slight degree; whereas green corn, green oats and peas, green soy beans, pumpkins,

and sugar beets have practically no effect on the odor and flavor of milk."

Cows have the ability to transmit objectional flavors in milk to their blood and the odors in turn are transmitted to the lungs where they are exhaled. Therefore, a good farm practice would be to take the milking herd away from the pasture two or three hours before milking and to carry on any additional feeding after milking.

According to Dr. Sharp, the taste of onion will be present in milk one minute after a cow eats a half a pound of such, and the taste of garlic will be present if a cow is allowed to breathe the garlic odor for ten minutes. Onions and garlic flavors are especially hard to remove from milk because their odors are soluble in the fat globules. In this event, it is advisable to clear pastures of onions and other objectionable weeds.

A cow poor in physical condition will most often produce a poor flavored milk. Naturally, the type of flavor varies with the physical disturbance. A severe case of mastitis markedly affects milk. Cows far advanced in lactation will often produce a salty or even a bitter tasting milk. This is due to an increase in sodium chloride and a decrease in milk sugar. For best results, by all means correct any and all physical defects in the dairy herd.

Because milk is such a sensitive food, it should be handled and processed with the utmost of care. Improper handling of the pasteurizer will give milk a cooked flavor. Milk utensils should never be made of copper, for this element acts as a catalyst in speeding up the oxidation of milk fat. There are certain enzymes present in milk which are capable of causing unfavorable flavors in milk under certain conditions. Lipase, for an example, is present in milk, and it is capable of breaking down the fat globules into the fatty acids and glycerol.

Odors absorbed from the air in milk is an uncommon occurrence. However, extremely volatile substances such as rotting manure, onion, garlic, kerosene, and citrus fruits, will flavor milk.



# Factors Influencing Soil Acidity

By C. B. FELLERS, '43

*Lime . . . For the Lands Sake*

Soil acidity is one of the basic limiting factors in determining the productivity of our soils. Farmers in South Carolina are becoming more and more aware of the acid condition of the soils in this state and realize that this condition must be remedied before a profitable and a more diversified system of agriculture can be established. Past soil surveys indicate that only about 20 percent of South Carolina's agricultural soils are in a proper condition, as to their acidity, for best plant growth. Realizing the seriousness of this problem in South Carolina, it is believed that a brief explanation of the nature and causes of soil acidity will be helpful to many.

Any moist soil always contains a certain concentration of hydrogen (H)<sup>+</sup> ions and a certain concentration of hydroxyl (OH)<sup>-</sup> ions. Acidity is due to the presence of an excess of (H)<sup>+</sup> ions and alkalinity to a preponderance of (OH)<sup>-</sup> ions. Since such a large concentration of ions is present, soil scientists have devised the term pH to represent the hydrogen and hydroxyl ion concentration. If acid is added to a soil, the hydrogen ions increase and the pH decreases. If alkali is added, the pH increases. A decrease in unit pH means a tenfold increase in the H ion concentration, and a corresponding tenfold decrease in the OH ion concentration.

Below will be found a suggested interpolation of pH's for mineral oils.

Very alkaline	above 7.5
Alkaline	7.0 to 7.5
Neutral	7.0
Slightly acid	6.0 to 7.0
Moderately acid	5.5 to 6.0
Highly to moderately acid	5.0 to 5.5
Highly acid	4.5 to 5.0
Very highly acid	below 4.5

The work of several investigators indicate that a direct toxic or destructive effect of an excess of hydrogen ions (acid) or hydroxyl ions (basic or alkaline) on root tissues probably does not take place except at extreme acidity or alkalinity. The reaction of the root sap of most agricultural plants fall in the acid pH range of 4.5

to 5, indicative that plant tissues are so constituted as to stand the acidities ordinarily found in soils. Various tests have shown that the reaction range of pH 6 to 7.5 (slightly acid to slightly alkaline) is the most favorable for the common agricultural plants.

Most South Carolina soils are too acid for best crop production. There are several reasons for this condition. Most of our soils are derived largely from acidic rock materials that are relatively low in calcium; therefore, most of our soils are acid. If the basic elements, especially calcium and sodium, are largely removed by leaching during the weathering process, the soil on formation becomes saturated with hydrogen rather than bases, and the resulting soil is acid. If on the other hand the calcium and sodium are not removed by leaching and remain to saturate the soil as it is formed, the resulting soil is then not acid but may even be alkaline. The extent of leaching is determined largely by rainfall, age of soil, temperature, and vegetation.

The use of certain fertilizers has long been known to increase soil acidity. In this connection ammonium sulphate has received considerable attention. When it nitrifies, two acid products result—nitric and sulphuric acid. These are both soluble and thus make the soil solution more acid, also increasing its tendency to remove bases from the soil so as to form a soluble salt. The soluble salt may be absorbed by plants or removed in the drainage water. In either case, the soil has lost some base and the soil as a whole is just that much more acid. Removal of bases at a greater rate than the acids through cropping also tends to leave the soil more acid by depleting the exchange acids of their bases. The legumes, particularly alfalfa and clover, make a heavy drain in this respect.

The most practical and economical way of checking soil acidity is by the application of lime. In 1939, approximately 130,000 tons of lime were used in South Carolina. Nitrate of soda, calcium nitrate, and basic slag also tend to check the swing toward a more acid condition of the soil.

# Instead of Hay---Ensile

By M. I. JENKINS, '41



Courtesy S. C. EXTENSION DEPARTMENT

What kind of silage shall I make? Grow the crop that will make the greatest tonnage with the least cost on your land. Any forage crop can be made into good silage. While there is a difference in the value of the silage made from the different crops, this variation is not great. The adaptability of the crop to your farming conditions should be the chief factor to guide you in your selection. There is probably one exception to this rule and that is the case of legume silage. Legume silage does not contain much more carbohydrates than grass silage and not as much as corn silage, but its high content of protein offsets its low yield per acre.

In sections where it will make good yields year after year, corn is the old stand by and the best producer of silage. But in many cases corn is either drowned out or drought greatly reduces its yield. In these places sorghum silage will probably give a much higher yield and it is nearly equal to corn silage in feeding value. Grass silage is cheap to make and easy to handle, but it does not produce the yield of corn or sorghum silage. Legume silage is not so well known as corn silage but it is growing in popularity and it definitely has a place in the feeding program. Legumes are the hardest crops to make into hay and they suffer many losses. The coarse stems are hard to cure and they are

unpalatable, the leaves shatter badly and the stacks and bales mold easily. Good legume silage is not hard to make, it is palatable and it is very nutritious. Legume and grass silage fit readily into the soil conservation program. These close growing crops stop erosion, build the soil, require little labor and some of them can be harvested twice a year. When pastures are growing rapidly in the spring and get beyond the control of the cattle, they can be clipped and made into the silage. The silos are usually empty at this time of year and this grass or legume silage will come in handy for feeding when the pastures are dry and short during the hot summer month.

There are two requirements to the production of good silage 1—Exclude all air from the silo by packing it well. 2—Have an adequate supply of carbohydrates and the right bacteria to form lactic acid or add enough inorganic acid to legume silage so decay can not take place. Have enough moisture in the silage to make it pack easily and cut the silage fine. The dryer the silage the finer the cut and the wetter the silage the coarser the cut should be. Silage between sixty and eighty percent water seems to give best results. Crops much dryer than this have been successfully ensilaged, but they are hard to pack and they are apt to mold. When there is too much moisture, a great deal of leakage will take place and the silage may develop a bad odor. Corn and grass silages need only to be cut and packed into the silo. The lactic acid will be produced by the bacteria in the plants. Legume silage has to have some preservative added. Many farmers add sorghum, corn or grass silage to the legume. This makes it keep well and makes it more palatable. If you do not wish to add another roughage to the legume, molasses, or cracked corn or other concentrate may be added. Hydrochloric or phosphoric acid is fluorine free, for fluorine is poisonous to cattle. The molasses silage is more palatable to some cows than the acid silage and it is more extensively used than the acid silage. However, the acid silage preserves more of the vitamin A in the legumes.



# *The Scourge of the South*

By T. E. GARRISON, '42

## THE BOLL WEEVIL

In the spring and summer a young man's fancy turns to love, but a farmer's fancy turns to farming. The major crop in the south is cotton; therefore, the farmer is concerned with cotton and its problems. One of these problems is the boll weevil which reduces the yield of cotton considerably. We know this because in the cotton field in July and August the ground is often covered with squares and bolls punctured by boll weevils.

The history of the boll weevil in the United States is comparatively short. It is a native of tropical America and invaded the United States in Texas in 1892. It moved east year by year until it reached South Carolina in about 1917. The farmers and the experiment stations of the south have done a great deal of work with the control of the boll weevil in the last fifth of a century.

The adult weevil is about one-fourth of an inch long, light brown in color when it first enters the adult stage, black in color several days later, and has wings. The adult lives during the winter in trash in fields and woods, bark of trees, and cracks in the ground. It is a common belief that large numbers of the weevils survive the winter. In spring the adults come out of their winter quarters and start laying eggs in the squares and bolls on the young cotton. The eggs are laid singly and hatch in about three to five days into the larva stage. The larva is the white grub with a brown head that we find in the squares and young bolls. The larva eats inside of the square or boll for a week or two. Then it changes to the pupa stage which lasts from four to six days. The adult is then developed and ready for another generation. The total time from the time the egg is laid to the adult stage is about three weeks. The boll weevil belongs to the class Hexapoda, a subclass Pterygota, order Coleoptera, and suborder Rhynchophora.

## CONTROL

The main thing the farmer is concerned with is the control of the boll weevil. There are several ways to reduce the losses due to this insect. These are: killing the insect directly, de-

stroying the breeding places, planting early, and spacing the rows and stalks close together.

We can avoid many of the boll weevils if we plant our cotton early, plant early varieties, fertilize the land heavily, and by cultivating the cotton. (An ounce of preventative is worth a pound of cure.) If we plant the rows and stalks close together there will be more early fruit which will escape the heavy crop of boll weevils.

We should destroy the wintering over places by plowing the stalks under before frost and by any other method that is practicable. It is not advisable to burn forests to kill the boll weevil.

We may use dust or liquid poison to control the insect. Both poisons have advantages and disadvantages.

We should start dusting when an average of ten percent of the squares have been punctured by boll weevils. Below this the weevils are not considered serious. We apply calcium arsenate at the rate of about six pounds per acre. This dust must be applied when the cotton stalks are moist and the air is calm. We must apply it either early in the morning or a few hours after the sun has set. Three applications should be made every three or four days. If it rains in twenty-four hours after applying the application it is wasted and should be applied again. According to South Carolina experiments the dust lowers the yield of crops on light soils and often the crops on all soils are attacked with plant-louse infection when the dust is used. There are several machines for dusting the cotton: hand-duster, saddle duster, one and two row mule duster, and other dusters.

The liquid poison method has proven to be most profitable and economical in the last few years. The mixture that is regarded as tops is: one gallon of water, one gallon of molasses, and one pound of calcium arsenate. It is known as sweet 1-1-1 mixture. It is usually applied with a mop made by tying a piece of burlap on the end of a stick. There should be three or four applications made a year. It should be applied as soon as squares start forming.

# Dairy Farming as a Way of Life

By G. W. BALLENTINE, '42



Courtesy S. C. EXTENSION DEPARTMENT

A financial profit is the primary purpose of the man who is engaged in dairying. With the profits from his herd he is able to enlarge his scope of farming, educate his children and furnish his family with those essentials which are necessary for a happy home. If a financial profit was the sole aim of dairying there would be a large percent of the dairy farms to-day unprofitable and unsuccessful. Besides making a profit a farmer gets much satisfaction and enjoyment from tilling his land, breeding highly productive cows and doing the kind of work he likes best. Let us say that men are engaged in dairying not only for a financial profit, but also for the pleasures which it affords.

To be a successful dairy farmer, one must have a definite vision of the things he wishes to obtain. It has been said, "Where there is no vision the people perish." There could be no truer statement. When men have real visions, great things are accomplished. Unless the dairy farmer has a clear vision of good cows, good feeding and management and good farming practices he will go through life milking poor cows, growing poor crops and getting nowhere toward the better things of life.

There are many factors which govern the success of dairy farming. Probably the most important of these factors is the love of work. Unless the dairyman has his heart in his business his work is nothing but toil and drudgery.

During the gold rush of 1849, men had to make a journey of two to three thousand miles requiring several months. Today with our modern roads and high speed automobile the same distance can be covered in five or six days. It seems reasonable to believe that the dairy industry would make as much progress as the automobile industry, but it hasn't. The average production of 25,000,000 cows in the U. S. is 164 pounds of fat per year. The sad fact is that this low production is just 4 pounds above the average production 40 years ago. This question has often been asked: "Why is it that so little progress has been made in the field of dairying?" The primary reason for this low production is the number of scrub cows and bulls in the dairy herds. The second reason is poor feeding practices.

In the U. S., 90 percent of the bulls used in our dairy herds are unable to sire daughters which will produce 350 lbs. of fat per year. Under average farm conditions a cow must produce 165 lbs. of fat per year to pay for her feed, care and depreciation. Each pound of fat over this amount is profit. With good feeding and management a cow should produce 300 lbs. of fat to make a reasonable profit for the dairyman.

Many cows are bred for high production, but are fed on poor quality feed which makes them scrub producers. It has been said that not more than 10 percent of the cows in the U. S. are fed a sufficient ration for best production. The cheapest way to produce cheap milk is to provide abundant pasture for spring, summer and fall grazing. If a cow has plenty of good high quality pasture during the summer months, production can be kept at a high peak on a minimum amount of grain. By feeding all the high quality legume roughage that a cow can eat during winter, a minimum of 500-1000 lbs. of grain will be needed per cow per year.

The profits of a dairy farmer depend upon his ability to have a clear vision of his aims, keep only high producing cows in his herd and to provide a complete quantity of good pasture and legume roughage. When he has succeeded in doing these three things he will have a successful and profitable dairy farm.





## BETWEEN THE

### Ag. Fair Plans

The agricultural and agricultural education students are planning to have another Ag. Fair for the year 1941-1942. With the success of the last Ag Fair the students feel that they can profit by mistakes and put on another successful fair.

The executives of the last fair recently named the head for the 1941-1942 fair: T. E. Garrison is chairman of the executive committee. This committee plans to do some work before school is out and be ready to get an early start at the beginning of next year.

The election of the manager, assistant manager, departmental heads and assistant departmental head will be held before school closes or at the first of next year. All agricultural and agricultural education students can vote for manager and assistant manager. Each department will elect its head and assistant head.

THE AGRARIAN

### The Animal Husbandry Club Project

The animal husbandry boys are getting practical as well as theoretical experience in animal nutrition and management.

In January they bought four Angus steers and have fed them out to twelve hundred pounds. Each member of the club fed these steers for one week. After the fattening period, they were sold at the fat stock shows throughout the state. This experience will be of benefit to the Animal Husbandry boys in their future work.

THE AGRARIAN

### Sears Scholarship Club

The Sears Scholarship Club recently attended "Open House" at the Y. M. C. A. At this meeting the new officers for 1941-42 were elected as follows: L. C. Hammond, President, Vice President, T. V. Wilson; Secretary, E. B. Collings; Treasurer, M. O. Berry; Reporter, W. F. Irwin.

The club is publishing its first annual "News Letter" this semester. This publication is edited by R. N. Gleason assisted by J. R. Burrows, C. B. Fellers, and J. T. McComb.

### A. S. A. E. Elects New Officers

At the last regular meeting in May, T. V. Wilson, rising Agricultural Engineer senior, was elected president of the Clemson student branch of the American Society of Agricultural Engineers. He will succeed R. J. Berry as leader of the group. Wilson, of Piedmont, is an outstanding scholarship student, being the highest ranking junior Agricultural Engineer.

Other new officers elected from the rising senior class were E. F. Stenstrom of Wauchula, Florida, to succeed C. J. Bethea as vice-president, and J. H. Jones of Boiling Springs, North Carolina, to succeed F. E. Rogers, as secretary and treasurer. S. A. Knight, Jr., rising junior from Summerville, was elected reporter to succeed E. M. Johnson.

THE AGRARIAN

### Kappa Alpha Sigma

Thirteen new members were recently initiated into Kappa Alpha Sigma, the Clemson Chapter of the American Society of Agronomists. Officers for next year were also elected. New officers who were elected are: H. H. Fellers, President; H. W. Hollis, Vice-President, R. G. Gettys, Secretary and Treasurer.

THE AGRARIAN

### 4-H Club

Ben Leonard, Vocational Agricultural junior from Due West has been elected president of the Tri-State Collegiate 4-H Club Conference to succeed Dorothy Banks of the Woman's College of the University of North Carolina. N. C. State University of Georgia, W. C. U. N. C., Winthrop, and Clemson were represented at this meeting.

THE AGRARIAN

### Agronomy Seniors Get Work

Dr. G. H. Collings, Professor of Soils, recently announced that seventeen of the twenty-nine Agronomy seniors are going in the army. Several of the non-R. O. T. C. boys have been employed by the Soil Conservation Service. Three or four of the Agronomy seniors are going to do graduate work.



## FURROWS

### Collings Revises Book

The third edition of "Commercial Fertilizers", an agricultural textbook written by Dr. G. H. Collings, Professor of Soils, has been sent to the printers for publication sometime in May. The book, printed by The Blakiston Company will be bound in waterproof binding and will contain numerous color photographs, Dr. Collings said.

— THE AGRARIAN —

### A. S. A. E. Gives Banquet for I. H. C. Officials

The Clemson student branch of A. S. A. E. held a banquet for some of the prominent officials of the International Harvester Company in April. Mr. H. P. Howell, Sales Promotion Manager, of Chicago, gave the address of the evening. Mr. Howell spoke on "How to Sell Oneself to an Employer."

— THE AGRARIAN —

### Good Showing Made By Judging Team at V. P. I.

At the Southeastern Judging Contest held at V. P. I. the Clemson Judging team won first place in judging cattle, shared first place with Southwestern in judging hogs, and came fourth in the entire contest. The judging team is composed of the following men: F. A. Gregg, D. C. Herlong, H. H. LaMaster, R. L. Bull, H. L. Crouch, M. D. Watkins, and is coached by Professor E. R. Hauser.

— THE AGRARIAN —

### Block And Bridle Judging Contest

At the judging contest here at Clemson sponsored by the local chapter of the Block and Bridle Club, the following men were winners in the senior division; H. H. LaMaster first place on mules, D. C. Herlong first place on sheep, T. E. Garrison first place on cattle, and C. B. Lowman first place on reasons alone. H. H. LaMaster was high-man of the entire contest on reasons and placing.

— THE AGRARIAN —

### Alpha Zeta

New Alpha Zeta officers who were recently elected are: W. M. Hobson, Chancellor; R. E.

Gettys, Censor; H. H. Fellers, Scribe; T. V. Wilson, Treasurer; and L. C. Hammond, Chronicler. These new officers officially took charge on April 25, when they held the final formal initiation of new members. These new members are: R. L. Stoddard, L. C. Martin, R. L. Scarborough, W. L. Betsill, E. V. Legare, W. W. Gardiner, T. C. Moss, and E. B. Collins.

On April 5, the forty-fifth chapter of Alpha Zeta was installed at Auburn, Alabama. The installation was attended by several cadets with Mr. R. A. McGinty, who is an alumnus of Auburn.

— THE AGRARIAN —

The Agrarian wishes to compliment the editors of the "SLIP STICK" on their well-written and instructive articles in their last edition. The article that created quite a bit of interest was "THE TENNESSEE VALLEY AUTHORITY" By S. R. Finley, '18. "THE VECTORSCOPE" by J. E. Woodward, EE. 41' is highly technical but the author read it and even understood some of the terms. The article that almost any "Ag" student could understand was "TELEPHONE COMMUNICATIONS, by Professor A. B. Credle, Asst. Professor of Electrical Engineering on the various and sundry means by which the telephone came into being. There was even a picture of an old telephone that was and as far as the author knows may still be in use here on the campus, and for comparison a picture of a much later model.

The "Editors" join in with the CADET CORPS in wishing that all in the state could see the campus as it is and will be for the next few months, a riot of various shades of beautiful green. Our campus is considered one of the most beautiful in the UNITED STATES and it's worth anyone's time to take a day off from their duties and drive up. Perhaps on that day the CADET CORPS will parade and this alone would repay one for coming up. Remember and come to see Clemson, you are always welcome.



# *The Need for Crop Diversification in the South*

By H. M. SIMONS, '44



Courtesy S. C. EXTENSION DEPARTMENT

The South has frequently been referred to as a region of one-crop farming. This statement is true only to the extent that cotton is the major cash crop. Corn, peanuts, sweet potatoes, rice, small grains, pecans, and numerous fruit and vegetable crops are grown.

However, most of these crops are clean-cultivated and are usually found in combinations that do not lend themselves readily to systematic farming that prevents soil erosion and loss of plant nutrients from the soil. An average of nine Southern states showed that nearly seventy-five percent of total farm acreage under cultivation was used to produce cotton, corn and grain sorghums, and only 7.5 percent was used for hay production. These figures indicate the pressing need for wider divergence of crops in the South.

The South has been called the nation's number one economic problem, and not unjustly so, for our standard of living is lower in comparison to other sections of the country. Being largely an agricultural section, the prosperity of the entire South is reflected by the economic status of its farmers and the fertility of its lands. Therefore, it is of vital importance that progressive methods of increasing soil fertility be practiced, and that a wider range of crops should be grown.

Farm experience has proven the value of the incorporation of large quantities of vegetable matter in the soil as a means of rebuilding and

maintaining soil fertility in the South. The system of one-crop farming has ignored this obvious principle so completely as to bring about a tremendous loss of soil fertility, and in some cases to even cause soil erosion.

Quite like other early settlers in other sections of the country, pioneer farmers of the South did not immediately recognize soil fertility problems. They cleared the land of trees, and for several years good crops of corn, cotton, and tobacco were produced along with small grains in some sections. Land was plentiful, and when the point of low soil fertility was reached, more land was cleared, the old land being allowed to grow up in broom sedge and seedling pines.

Today, however, we are faced with problems which our forebears never had to face, and perhaps, of which they never even dreamed. Vital problems of soil conservation, labor problems and market conditions must be dealt with by the farmer if he is to get fair returns from his crops. In addition, he must be able to predict in advance the probable best selling cash crops for a particular season.

The eventual future of the South will be realized through the utilization of its great store of raw materials, chief of which is its soil. When the South fully realizes the value of its land through the medium of diversified crops, it will cease to be the nation's number one economic problem, and instead it will become a truly great agricultural and industrial region in our unified nation.

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THE HORTICULTURE DEPARTMENT

# The Changing Role of the County Agent

By J. A. MIXON, '43

America's vast capacity to produce has not been by chance but has been brought about only with great effort extending down through history. First, we were endowed with great natural resources; second, the agriculturist's optimism, ideas of exploitation, and enthusiasm to improve techniques and methods of production have been vital factors in our attaining this peak. This favorable progress, however, is somewhat responsible for most of our present ills, particularly that of overproduction.

In Europe today there lurks the fear and threat of food scarcity; in America our concern is with the other extreme—commodity surplus. A conception of our agricultural progress can be traced through acts of the United States Government which were directed toward progressive farming. As far back as 1776, proposals were made for the creation of a Federal Department of Agriculture. George Washington organized a board for the purpose of improving Agricultural methods through research. He instructed Consuls and naval officers who went abroad to send information of improved methods and new discoveries. John Quincy Adams established a Botanical Garden and organized a committee on agriculture in the Senate. A similar committee has been established in the house five years earlier. In 1839 Congress appropriated \$1,000.00 for collecting agricultural statistics, conducting agricultural investigation, and distributing seed. After 1847 annual appropriations were made for these activities.

Since the creation of the United States Department of Agriculture in 1862, development has been rather rapid. The year 1887 marked the birth of the experiment station. The turn of the twentieth century saw a new field of service inaugurated—the County Demonstration work. All of these government activities were climaxed in 1914 by the Smith-Lever Act providing for County Agricultural Agents.

The County Agent came at a very opportune time, during the era of the World War. Our government, to avoid a food shortage, sought to stimulate Agricultural development, lifted it from its rational course of progress, and

forced it to an unnatural exertion in response to an abnormal demand. In order to attain this production peak, complex changes had to be made. The County Agent's task was to aid the farmers in becoming better producers. Therefore, his role was one of a scientist, educating farmers to the improved methods, always aiming at greater production. Statistics reveal only 9 percent more animal units on farms than in 1901, but during this period meat, milk, and egg production increased 55 percent.

After the war when the soldiers of Europe beat their swords into plow shares and once more became self sufficient, we accumulated commodity surpluses. This situation may be viewed as an indication that the County Agents have accomplished their purpose. But, contrary to this view, their services are not less but vastly more important now than ever before. This is true because economic problems facing the farmer now are more incomprehensible than were the scientific methods taught him in the past.

Complex changes have affected the whole of American Agriculture methods of production, quantities produced, the manpower needed in farming, capital requirements, size of farm units, the organization of the farm, operating cost, conditions of tenure. It is not too much to say that our destiny will depend to no small extent on the County Agent's understanding of these factors and his ability to direct them for the service of our people.

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# The War and the Farmer

By J. L. SCHAFFER, '43

At our Agricultural Fair there was on exhibit that all far-sighted persons had to take note of—that was the effect of the present war on our exports of agricultural products. In all too vivid charts, the Agricultural Economics department showed how our agricultural exports were declining due to the present war.

First, and most important to the Southern farmer is cotton. Cotton was hit very hard by the war. The first year of the war we exported six million bales, but the second year it is not expected to exceed one million bales. Compared with pre-war levels, this means that cotton producers have lost a market of four million bales, which is equivalent to about one third the crop produced last year.

Tobacco does not present a brighter picture. Unless the United Kingdom takes up options it owns on our tobacco we shall not export over two hundred million pounds compared to the four hundred and fifty million pounds average prior to the present hostilities.

The fruit growers are hit extremely hard by the war. Apple exports have gone down to nothing. Before the war they exported about 12,000,000 bushels of apples, but they do not expect to export over one-half of a million now. All citrus fruits exports have gone down about 50 percent.

All in all, our exports the first year of the war were 765,000,000 dollars but they are not expected to go over 325,000,000 dollars this year, the second of the war.

Now what is the farmer going to do? The present National defense program will take a good bit of surplus, thus alleviating some of the pressure, but this will not solve the Southern farmer's problem. There must be other things done to help the farmers of the United States. A program that must include the following:

A. Expand efforts for the consumption of food and clothing among low income groups.

B. Need for reclaiming foreign market when the war ends.

C. Continuing readjustments in farm production.

D. Continuing to protect agricultural price structure.

E. The need for anticipating readjustments

when the present defense program ends.

F. Remembering the fact that soil conservation is an essential element in any long-run program for agriculture.

All the above are requisites in any program we may plan to aid the farmer.

The southern farmer by far is worse off than the farmers of any other section of the United States. The foreign market for cotton is about gone, and it has a very dense rural population. The gravity of his problem is certain to increase as the war continues.

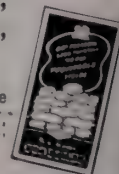
Our only hope is that a far-sighted program will be put into effect that will decrease our production of commodities, so there will be no great surplus, and to stabilize prices so the farmer's plight will not be too greatly aggravated by the present war and its far reaching effects.

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## SEED DISINFECTANTS

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# THE AGRARIAN PRESENTS

## DR. JULIAN C. MILLER



Dr. Julian C. Miller

Clemson graduates in all fields have attained varying degrees of success, but few have gone farther or done more for agriculture than Julian C. Miller, Head of Horticultural Research at the Louisiana Experiment Station. Dr. Miller graduated from Lexington High School in 1915 and entered Clemson in the fall of that year. World War I interrupted his collegiate career in 1917 when he entered the navy. During his two years of service, he attained the rank of Ensign in the Naval Reserve. 1919 saw him resume his studies in horticulture at Clemson, and in 1921 he secured his diploma.

Dr. Miller then became an instructor at North Carolina State College, where he remained for a year and half. From there he came back to his native state to enter the Extension Service and served as county agent in McCormick and Orangeburg counties. The offer of a graduate fellowship at Cornell caused Dr. Miller to resign in 1925. His master's degree was obtained in

1926, and he qualified for his PhD. in 1928. From Cornell the newly-made doctor went to Oklahoma A and M College as Associate Professor of Horticulture. His one year term at Oklahoma ended when he went to the Louisiana Experiment Station as head of the Horticulture Department.

Under Dr. Miller's direction many new varieties of crops have been developed. At present, work is going on toward the development of new and better varieties of sweet potatoes. Other crop improvements include an early maturing cabbage, the Louisiana Copenhagen; the Louisiana sweet collard; three new hot peppers; the Louisiana Sugar Bowl squash; the Klonmore strawberry and numerous other profit-increasing crops.

Dr. Miller has had numerous horticultural papers published and is widely known for his experimental work. Only recently the **Country Gentleman** and the **Progressive Farmer** carried discussions of his work.

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## What is An Entomologist?

**Editor's Note**—While working as an entomologist in North Carolina, Professor Franklin Sherman, now at Clemson, received a letter from a young lady inquiring as to what an entomologist was. This unique bit of prose was his answer. The young lady had the last word by having it published in the "Progressive Farmer."

I've noticed several times of late,  
 When I've been around the state,  
 That folks inquisitive, like you  
 Will say, "Now tell me what you do.  
 I hear that you an office hold,  
 And spending lots of public gold,  
 I'd like to get a faint idee  
 Of how you earn your salary."  
 And while he does not say the rest,  
 I've often thought that in his breast  
 The questioner the notion hugs.  
 That any man who studies bugs  
 Must be, to put the matter light  
 A sort of public parasite.  
 And so today when I had signed the mail  
 And had it off my mind,  
 I thought I'd run the letter through  
 And summarize a few for you.  
 Here's a note from a man named Brown  
 Whose home is Mount Airy town.  
 He says his apple trees are sick,  
 Can I suggest a tonic, quick?  
 I write him that I would some day  
 The present winter make a spray  
 Composed of Sulfur and of lime  
 And that it should bring them to time.  
 And now here comes another one  
 A man from little Washington,  
 Who says, he in a paper sees  
 That we can doctor honeybees.  
 And as he keeps a few old stands,  
 Why, he just nat'rually demands  
 That we tell him all we know  
 Of how to make the thing a "go".  
 And so I strive his heart to win,  
 By mailing him a bulletin,  
 Which gives a little summary of facts  
 Compiled from inquiry conducted several years  
 ago.  
 And this I hope will help him so  
 That, he can make the business pay  
 And swim in honey every day.  
 Another writes, "Will you please see  
 What this is on my 'simmon tree?  
 I send a twig to show a scale  
 Which seems the branches to assail,  
 Not that I care so much about this tree,

But I'd like to find out if it is likely to attack  
 The orchard near my shack."  
 But it is not, I tell him so,  
 And with that let the matter go.  
 The next, and this straw almost broke the camel's  
 back  
 Is like a joke.  
 A firm way up in Philadel,  
 Inquires to know if I will tell  
 As near as may be the amount  
 Of poisons used on all account  
 To kill the bugs on tree and vine  
 In all the state of North Ca'line?  
 Be—gobs, they must think  
 That I've seen the orders for the Paris green  
 And arsenate of lead and all the other poisons  
 I could call  
 And that I have kept a record true  
 Of all of it, for them and you.  
 Another found his apple trees  
 Thick with bugs the size of fleas,  
 Which bore small holes the size of shot,  
 And damaging the trees a lot.  
 I write him that the strongest dope  
 Is strong solution made of soap.  
 About a pound of soap sliced thin  
 And boiled, a pail of water in;  
 And this applied with brush or mop  
 Should make the little rascals hop.  
 A gentleman in Franklin-ton  
 Found bugs his cabbages upon.  
 He says they suck and kill his leaves,  
 Until his heart turns sick and grieves.  
 He says this bug (the Harlequin)  
 Will stare him in the face and grin  
 And kill his cabbages despite  
 Of all his labors day and night.  
 It is the first bug he has seen  
 That seems immune from Paris green,  
 And he would fain my aid invoke.  
 Poor man, I know his heart is broke,  
 For he must rise early in morn  
 And pick them off by hand at dawn,  
 For Paris Green is of no use,  
 Against a bug that sucks the juice.  
 Lo! Here's a letter from a gent,  
 By Uncle Sam to Texas sent,  
 Who's taking up pellagra's scare  
 And wants me to compile with care,  
 All data that had come  
 About the flies Si-mu-li-um,  
 For these wee creatures thought so small

It may be that they carry all  
 The germs which cause this dread disease,  
 Will send him my records, please?  
 A lady who takes greatest pride  
 In hedges by her garden side  
 Sends me a sickly-looking leaf  
 And says it is her best belief  
 That some cale insect or disease  
 Has seized the bushes.  
 Can I please advise her what to do,  
 And thus restore the sick unanimous?  
 She must use a wash of oil  
 Prepared with soap by utmost toil,  
 And patience and persistence, too.  
 Must be her aids this work to do,  
 Because against this little scale,  
 No half-way measures will prevail.  
 And what I've mentioned here, I'll say,  
 Is from the letters of today.  
 And while I do not make the claim,  
 That every day brings me the same  
 Yet this is not exceptional,  
 In fact, it is quite typical.  
 Now how can one make sound replies  
 To such a range of inquiries?  
 Is "pull" and "influence" enough?  
 Can all these folks be fed on guff?  
 Can any man who does not know  
 A bug from fish or buffalo  
 Give out the names and habits too,  
 Of all these pests as we must do?  
 And how can one know when to say,  
 "The remedy for this is spray,"  
 Or "This one is controlled by soap,"  
 Or "Paris Green," or other dope?  
 Ah no, my friend, you've not begun  
 To sound the depths wherein we run.  
 The world holds men by the scores today,  
 As keen as ever made of clay,  
 Whose lives are spent in solving tasks  
 Which at our hands the public asks.  
 And while most persons never see  
 Science in Entomology,  
 Yet there it is as deep and true  
 As my offering aid to you.

### THE FARM GARDEN

continued from page 9

superphosphate to each ton of manure to aid in the decomposition and also greatly increase its value as a fertilizer. Lime should be applied when it is definitely shown by actual test to be needed. Most of the garden vegetables do best on soils that are slightly acid, and the addition

of lime when it is not needed will cause injury to them.

To get the greatest returns and benefits from a farm garden, all space should be fully occupied throughout the growing season. Often it is possible to have certain vegetables growing in the garden every month of the year. A good practice is to follow the present crop with some unrelated crop. Crops of the same kind are often attacked by the same diseases, and unless an unrelated crop is used, there is danger of some disease present in the former being transmitted to its successor.

Always plan ahead and be sure to have a supply of seed when planting time comes. Seeds saved at home should be carefully inspected before they are planted because much time and labor are wasted in planting seeds that fail to germinate. Seeds can be safely kept and protected from mice if they are put in a tin box or can and kept there until time for planting.

A farm garden properly planned and cared for will add materially to the well-being of the farm family by supplying foods that might not otherwise be provided. If a "Live At Home" program is to be carried on successfully, the farm garden cannot be neglected.

☆ ☆

*Clemson College Laundry*

☆ ☆



## Miss Cornelia Ayer Graham, B.S.

Miss Graham, Clemson's head librarian, although originally from Georgia, considers herself a true South Carolinian as her father and mother, Mr. and Mrs. Bothwell Graham, came from Barnwell and Edgefield counties respectively. Besides, Miss Graham has had her permanent residence at Clemson, for the past nineteen years.

Miss Graham graduated from the Georgia State College for Women, and later completed a librarians' course at Columbia University. She has seen a bit of the outside world, for she traveled through twelve foreign countries during the summer of 1938.

Last summer Miss Graham traveled through North Carolina, Virginia, and Georgia where she inspected the libraries and museums of most of the noted colleges in those states. She discussed library problems with the librarians of these colleges and received a wealth of ideas for the Clemson College Library.

Miss Graham began her career at Clemson in 1922 when she became an assistant to Miss K. B. Trescot, head librarian at Clemson then. During the nineteen years following, she held every position the library had to offer. One interesting feature in her work was her five years experience as head of the agricultural reference department where she was in charge of all books, publications, and bulletins pertaining to agriculture. After ten years of hard work, in August, 1932 Miss Graham became head librarian and has held the position ever since.

Perhaps a few of us are not aware of it, but Clemson's head librarian is a woman of notoriety for she is listed among Who's Who Among Librarians, Who's Who In Education, and she has recently been asked into Who's Who In South Carolina. She is quite proud of the fact that she is one of the Daughters of the American Revolution and of the United Daughters of the Confederacy. In 1934 she was elected secretary of the South Carolina Library Association, and in 1936 she was elected president of the same group. She has also served on a number of committees for this organization.

During her spare time, Miss Graham finds it enjoyable to read a good book. She belongs to the Presbyterian Church and is a member of the Church Auxiliary Circle.

Miss Cornelia Ayer Graham is truly one of Clemson's most valuable women, for her chief

interest is Clemson and "putting Clemson on the map" by a continued improvement of the library. Miss Graham claims she has spent the best portion of her life in her nineteen years at Clemson, for she has grown and worked with the College during those years. For the splendid part she has played and is playing in making Clemson College one of the finer educational centers of the Nation, we salute Miss Graham.

## BLACK MAGIC

continued from page 10

for Research at Yonkers, New York: from an organic compound named Ethyle b Naphthaoxyacetate. One can see the importance of such an experiment as seedless watermelons may be developed, imagine eating watermelons without taking time out for the disposal of seed. The biochemical and physiological causes of fruiting without the usual fertilization of the seed by the male germ or pollen caused by this organic compounds have not been discovered, but with new discoveries and painstaking research much can be learned.

One can not very well write an article concerning the "freaks" of chemistry on plants, without saying a few words about the highly publicized colchicine. This compound has a powerful effect on plant tissue, its most useful function being the power to effect the number of chromosomes in a plant. Crossing one species which has 16 chromosomes with one that carries 32, can not be done normally, but if colchicine is used on the 16 chromosome plant, the two will unite and a cross will result which may cause interesting and valuable new hybrids. As many physiological concepts hold true in plants as well as animals, this organic compound may be highly beneficial to the animal breeder as well as the plant breeder.

The proper use of organic secretions or hormones to promote growth will focus much light on the various scientific fields of agriculture. If growth substances are present in organic manures, a knowledge of this presence will help us to understand more about soil fertility. These substances will enable the plant breeder to propagate plants from cuttings and seeds, bud inhibition, and fruiting without pollination. By the proper use of these various chemical compounds they will pay higher and higher returns to the nation.



## Farm Plan Contest

By C. B. FELLERS, '43



L. C. Martin

Mr. C. L. Stevens of Baltimore, Maryland, made available \$500.00 to be awarded as prizes to students of Clemson Agricultural College and the University of Georgia for preparing plans for the operations of a family-sized low country farm. In preparing this farm plan, the students assumed that they were the operator of the farm and that they had no personal preference as to type of farming. They carefully decided on the system of farming that seemed most logical for this farm. After deciding on the system of farming, the contestants described the recommendations sufficiently to make its workability clear.

The manuscript was limited to 2,000 words; tables, maps and explanatory legends were not included in the word limit. A table of estimated receipts and expenditures by months and a summary for the year were turned in with the farm plan. Based on the preceding estimates, a financial plan for a year was submitted. Included in the financial plan was the amount of money borrowed, the source, cost, and security offered. A plan for supplying some of the food requirements of the family from the farm was also submitted with the farm plan.

Out of the 75 entries turned in, five of the best were selected and awarded with prizes. The

manuscripts were judged on neatness, grammar, organization of plan, and the actual farm plan. The first prize of \$100.00 was awarded to Lloyd C. Martin, Agricultural Economics Senior from Seneca, South Carolina. The second prize of \$50.00 was awarded to L. C. Hammond, Agronomy Junior from Seneca, South Carolina. W. C. Owen, M. D. Watkins, and F. T. Mathias, Jr., received the next three prizes of \$25.00 each. Martin will compete with the University of Georgia's winner for an additional award of \$50.00.

Mr. R. A. McGinty, Vice-Director of Agricultural Experiment Station, was the Director of the Farm Plan Contest. The committee working with Mr. McGinty was: M. C. Rochester, Farm Management Specialist, S. C. Extension Service; Dr. G. H. Aull, Head, Department of Agricultural Economics; Dr. M. J. Peterson, Assistant Agricultural Economist; W. L. Abernathy, Supervisor, Test Demonstration Farms, S. C. Extension Service; J. D. Kinard, Assistant Agricultural Economist.

### SILOS

continued from page 8

with straw and dirt. Labor is cheap in the south and the extra labor involved in the use of a trench silo is not as serious a drawback to its use as it is in the north. Trench silos are especially good with grass silage because the extra pressure of grass silage will not hurt the walls and there is no harm from leakage.

Over a period of years when all costs are considered, construction, handling of silage, interest on investment, value of silage lost, and repairs, there is not much difference in the cost of storing silage in a trench silo and in an upright concrete silo. The concrete silo has the advantage of giving long service, and the trench silo has the advantage of being easily and economically constructed by any farmer. You will get from your silo what you put into it. Temporary silos are good for storing in an emergency, but they are no cheaper than good silos in the long run and are a lot of trouble. Farmers have kept silage by just stacking it in the open, but a lot of waste resulted and this is not recommended.

Always test a silo, especially a trench silo, with a flame for carbon dioxide before entering, this is a deadly gas given off by silage and it settles in the silo for it is heavier than air. Pack the silage well to exclude all air to prevent spoiling. This may be done with a tractor or team in a trench silo.



# South Carolina Tenants

By J. L. SCHAFER, '43

Since the beginning of time men have fought for land. They would kill and steal for land. No obstacle too great was found to stop the thirst for land. No peril could cease their desire to have land of their own. Foremost in the minds of men has been the desire for the "Good Earth."

In the state of South Carolina 34.3 percent of the farmers are tenants. Over one third of the men that till the land do not work for themselves but for other people!

The average yearly income, if you desire to call it such, is \$602.08, of which \$202.68 represent value of food products for home use. This is for an average family of 6.1 persons. In other words, less than one hundred dollars a year was allotted to each person!

The living conditions of this class is pathetic. Fifty-nine percent of these people live in less than five rooms, remember this is for a family of over six persons. Only five percent of these houses are painted! Only five percent of these houses are white washed! It is needless to say these conditions are appalling.

What is to be done about this condition? Certainly we can not permit one-third of the farmers of South Carolina to live under such conditions. The Federal Security Administration is now trying to solve this problem. There is an effort being made to give the tenant farmers an opportunity to possess land of their own. The F. S. A. is advancing loans to these farmers. This is what the F. S. A. had to report in the February, "The tenant purchase borrowers have repaid 97.4 percent of the principal and interest due on their loans up to June 1930." This proves that the tenants are a good financial risk.

The farm tenants do not stay in one place very long. They usually move from one place to another with great rapidity. This caused an appalling amount of sickness to their families, and a lack of education for their children. This physical and mental illness must be eradicated! Let us draw no illustrations about the tenant farmer. We must never turn our backs to him and his plight. We must comprehend fully his

position, and realize that he is a man with no home of his own. Every year he must depend solely on the returns of his crop to get out of debt. Once being out of debt it is not very long before he returns to the indebted stage.

We can not hope to completely rid ourselves of the tenant in one bold stroke. There is no Utopian Program that will solve the problem over night, but we must plan a program that over a number of years, perhaps decades will slowly and surely eliminate this black mark in our agriculture. The F. S. A. is doing its share to do away with this problem. Every one can help by educating the tenants children, by giving the share croppers adequate medical care, and by helping him plan his farm program in such a manner that he will be able to reap returns to insure himself of better living conditions.

It is only by a far-sighted program can we hope to eradicate this condition, which in many ways resembles the feudal system of yore.

Serving the Peach Growers of South  
Carolina, Marketing Peaches and Supply-  
ing Insecticides and Sprays of All Kinds.

**SOUTH CAROLINA  
PEACH GROWERS ASSOCIATION  
219 Montgomery Building  
SPARTANBURG, S. C.**

# Weeds A Major Problem

By Q. L. CHAPMAN, '43

A weed has been defined as a plant out of place. This definition is not always satisfactory because a stalk of corn that is grown in a cotton field is not considered a weed. A weed maybe accurately defined as a wild plant which has the habit of intruding where it is not wanted.

Weed control is one of the greatest tasks of the farmer. Farming has commonly been referred to as a war against weeds. The importance of keeping weeds in subjection cannot be emphasized too strongly. It has been estimated that weeds cost the farmers of the United States over a billion dollars annually.

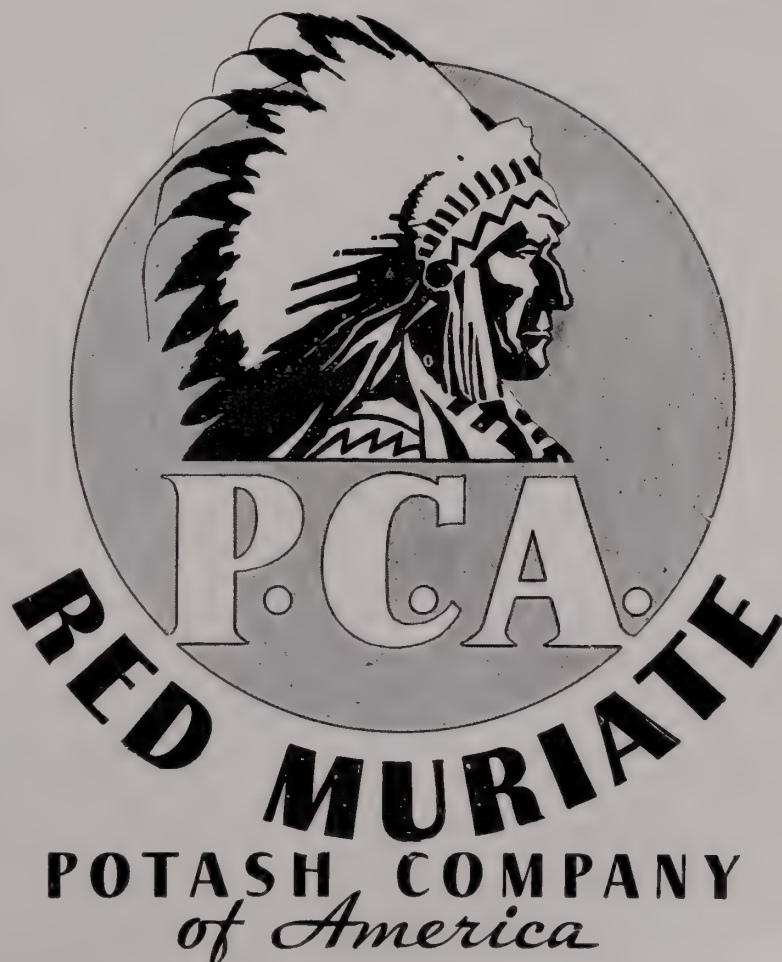
It is not known exactly why weeds cut crop yields so drastically. It is known that weeds deprive crops of nutrients, moisture, and sunlight. However, experiments have shown that when these materials are very abundant, the weeds still seem to exert a detrimental effect upon the plant. It is thought that this is maybe due to poisonous materials given off by the roots. The harvesting and curing of crops is often hindered by large weed stalks and oftentimes weed seed. In the Piedmont region the bulblets of the wild onion is a great nuisance when clovers are being harvested with combines.

Weeds are classified into three groups, according to their duration of life. These are annuals, biennials, and perennials. A common annual is the bittersweet, one of the greatest pasture pest of the Upper and Lower Piedmont. The seeds of this plant are scattered by wind, hay, and animals. Most ordinary annuals produce from 10,000 to 1,000,000 seeds per plant. The common thistle is one of the few biennials in this state. This weed is more prevalent in the pastures of the Upper Piedmont. Wild onion is the most serious perennial in South Carolina. This weed reduces the price of dairy products by giving them an unpleasant taste.

Hutcheson, Hodgson, and Wolfe found that weeds cause direct losses to farmers in the following ways: they lower the selling value of the land; they reduce crop yields; they increase the expense of cultivation and harvest; they reduce the market value of crops; and in certain cases they poison or otherwise injure man, live-stock or livestock products.

The addition of fertilizer is one of the best methods of controlling weeds in pastures. Grasses will usually dominate when they are given favorable soil conditions. Mowing the pasture is a common practice in South Carolina and it has become a very efficient method. The weeds should be cut before the plant blooms so as to prevent a greater spread of seed. In some instances sheep and goats are placed in pastures because of their tendency to eat weeds. Herbicides are now being used quite extensively in the controlling of weeds. Other means of controlling weeds are by cultivation, smothering, crop rotation, and use of clean seed.

Farmers of South Carolina must learn quicker and better methods of weed eradication. Weeds are a challenge to the farmer, and if the farmer wishes to succeed, he must emerge victorious.



General Sales Office: Baltimore

Southern Sales Office: Atlanta



## Have You Read?



Courtesy S. C. EXTENSION DEPARTMENT

**ABRAHAM LINCOLN—THE PRAIRIE YEARS**, by Carl Sandburg. Harcourt 1926. 2v.

(An extraordinary vivid and detailed account of the first 51 years of Lincoln life, before he became president. "... more than an ordinary biography; it is a captured atmosphere, a portrait done with the exquisite, patient care, the intent reverence, the elusive tenderness of a Rembrandt."—*Annals of American Academy*.)

**"OUT OF THE NIGHT"**, by Jan Valtin. Alliance 1940. (The long, detailed autobiography of a German, who, caught in the frustrations of the post-war period, joined the Communist party and worked for it for years as an agitator among seamen. He became disillusioned with the methods used by the Communist, was later caught and tortured by the Gestapo, and finally escaped.—*Booklist*).

**CHIANG KAI-SHEK; MARSHALL OF CHINA**, by Sven Hedin. Day. 1940. (Dr. Hedin is most convincing when talking about the subject he knows and loves best—Central Asia. His chapters on China and the Border States ...

are of real interest and importance to the student of world affairs.—*Sat. Review of Literature*.)

**THE JEWISH CONTRIBUTION TO CIVILIZATION**, by Cecil Roth. Harper. 1940. (Outlines the past which Jewish people have taken in the development of Western Civilization. "One desiring the truth will find adequate coverage by a competent scholar. Many a surprise will be met." *Christian Century*).

**THEY LIVE ON LAND**, by Paul W. Terry and Verner M. Sims. Bureau of Educational Research, University of Alabama, 1940, pp. vix, i 313.

**OUR FOREST**. By David Cushman Coyle. Washington, D. C., National Home Library, 1940, 150 pp. 25 cents.

**PLANTING DESIGN**. By Florence Bell Robinson. New York. Whittlesey house, 1940. 215 pp. \$2.75 cloth.

**OPPORTUNITIES IN GOVERNMENT EMPLOYMENT**. By J. L. O'Rourke. New York. Garden City Publishing, 1940, 307 pp. \$1.00.

**ON MEDLOCK FARM**. By Henry Tetlow. New York, William Morrow and Company, 1940. 272 pp. \$2.50.

**HOW DEAR TO MY HEART**. By Mary Margaret McBride. New York, Macmillan Company, 1940. 196 pp. \$2.00.

**ON THE LONG TIDE**. By Laura Krey. Boston, Houghton Mifflin Company, 1940. 637 pp. \$2.75.

**PRACTICAL FARMING FOR BEGINNERS**. By H. A. Highstone. New York and London, Harper and Brothers, 1940. 199 pp. \$2.50.

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## LOOKING FOR NEW OPPORTUNITIES IN AGRICULTURE

Continued from page 4

changing soil conditions in order to keep well ahead of the major factor that tend to affect economic production. Not until the scientist discovers adequate means of producing better forage plants can the southern states balance plant and animal production.

The farmer must study his problems and school himself in the changing concepts of agriculture. He should be thinking in the competitive field in which he is now a part. He will find that the public and consumer demand good quality and often specify variety as well as specialized package. Today quality products are far more valuable than quantity productions in a prosperous agricultural approach.

More and more South Carolina farmers must look for cash producing crops. The disturbance in cotton and tobacco production and losses in money values to the state demand that the far-

## Silage Crops

By M. I. JENKINS, '41

Every where one turns he hears, "Save the natural resources, conserve the soil and the forest." All of this is well and good. It should be done. But there is another leak in the farmer's pocket book, a large leak, but one which we seldom hear about. It is the loss of forage crops, crops which are already produced but are wasted before they are consumed. What causes these losses? Rain, which leaches and rots a large percent of all our hay crops.

Every field of sun cured hay has about eighty percent of its vitamin A and a large percent of its nutrients bleached out.

Hay is stacked or baled when it is a little too green or wet, molds and deteriorates and is largely unfit for consumption.

Hay that is too mature or too dry when it is harvested, loses a great many leaves by shattering during harvesting or feeding. This is especially true of valuable legume hay because their leaves shatters easily.

Unless hay is of the very highest quality much of the coarser parts are refused by livestock.

It has been estimated that even the finest hay cured in an ideal season and feed under the best of conditions loses about one third of its nutrients and most of its vitamin A. If the farmers of the semi arid west lose thirty percent of the nutrients in their hay crops, how much do the farmers of the humid south lose?

Forty percent of the nutrients in the corn plant are left standing in the field to leach out and rot when the ears are snapped off the stalk.

Stripping the leaves for fodder is no better than only snapping the ears for this practice reduces the yield of grain more than enough to make up for the value of the fodder.

There is yet another loss which the farmer who produces dry forage is subject to. This is fire which destroys many tons of hay and the barns and livestock along with it.

Stop a minute and think! It is true that our lands do not produce great yields, but still there is no use to throw away such a large percentage (in some cases more than half) of what they do produce. These great losses can be stopped almost completely, and they can be stopped quickly, easily, and most important of all economically.

continued on page 32

### PROTECT YOUR PEACH CROP

with

## PAN PEACH SPRAY

PAN contains all the necessary ingredients to assure maximum protection.

### SIMPLE TO USE

PAN is used at the rate of 8 pounds to 50 gallons of water and is put up in convenient units:—Cases of 4-8 lb. bags, cases of 2-16 lb. bags and cases of 4-16 lb. bags.

Leading peach growers throughout the country find PAN PEACH SPRAY the best answer to their spraying problems.

The J. W. Woolfolk Company

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# SLICED HAY

**Opens New Future  
in Forage Farming  
and Feeding**



**Small Crew  
★  
Small Investment**



Low-priced pitch-on Trailer-Baler rolls on two rubber-tired wheels, goes anywhere behind motor car or small tractor, gets to work in a jiffy with power from its own air-cooled engine. No staking down or belting up; ideal for field baling of cocked hay, handier and easier for stack and barn baling. See both these balers at hay-machine headquarters; also new 4-bar side-rake geared to go at tractor speed and new all-forage cutter for all kinds of silage and chopped hay, fodder, etc. You are always welcome at our branch houses and factory display rooms. J. I. Case Co., Racine, Wis.



Here is hay as easy to feed as helping yourself to a slice of bread. No tugging to dig matted hay from mow or stack, no struggle to tear apart the folds of ordinary bales, no loss of leaves by rough and repeated handling.

And what hay! Richer in leaves, in color, in vitamins, in nutrients, in softness and palatability. Air-conditioned hay made with a Case side-delivery rake and then baled at the ideal stage of cure. Baled with a new continuous-feed pick-up baler that weighs no more than an average motor car, pulls with a small tractor, works with two men, stays in step with 7-foot tractor mower and side-rake. A baler that has no blocks to handle, that measures every bale to same size with automatically spaced dividers.

The Case blockless pick-up baler is built for individual hay growers, to bring them the blessings of sliced hay with a small family-size crew and a surprisingly small investment. It saves the labor of loading loose hay, the dirty work in the hay mow. It multiplies the capacity of storage space four or five-fold, reduces risks from fire. In addition to all this it is the ideal means for saving straw from the combine in the preferred form both for bedding and for chemurgic uses.

# CASE



**SILAGE CROPS**

continued from page 30

How? By the use of silage.

Why use silage?

1. It is a cheap feed.
2. It can be made in any kind of weather.
3. It saves the whole crop.
4. It is a very palatable feed.
5. Any forage crop can be made into silage.

When all the expenses are considered, it cost about the same to make a ton of hay as it cost to make its equivalent in silage. This does not take into consideration the value of the nutrients saved by putting the whole crop into silage. Silage can be made when the land is too wet to use the labor for plowing or when the crop is too wet to cut for hay. Corn stalks and all other coarse forage can be entirely utilized. Silage is the nearest thing to the green succulent pastures which is the natural food for all classes of livestock. All crops, the ones which yield the greatest tonnage on your land, even grasses and legumes, can be made into high quality silage at low cost.

Even with all of its desirable features, silage is not a perfect feed, but it is by far the best roughage which we can use in this humid area where good hay is hard to make and seldom seen. If it is so good, then why do so few farmers use silage? There can be only one answer. Not enough is known about its many virtues. In the sections where silage is well known and adapted, it is used very extensively and no other harvested forage can compare with it in popularity.

**WOOD'S YELLOW SOYBEANS**

**Yield 25 to 45 Bushels per Acre, 2 to 3 times as Much as Other Varieties**

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Strong upright stalk. Disease, Storm, and Drought Resistant. Best Soybean for oil, hogging down, or hay. N. C. State College reports: "It is superior to standard varieties like Mammoth Yellow and is non-shattering. Write for WOOD'S CROP SPECIAL illustrating improved seeds. Mailed free.

**T. W. WOOD & SONS**  
Richmond, Va.

**New South Carolina Agriculture Industry**

continued from page 3

it. The agitators are removed, the curd is allowed to settle and the whey is pumped off. There will remain about six inches of curd in the bottom of the vat. This toughened curd is cut into slabs about a foot wide and is turned every fifteen minutes while remaining in the vat. The curd is then ready to be "milled."

Milling is the final process involved in the manufacture of cheese. First, the slabs of curd are placed in hoppers and cut into pieces about two inches long. Then salt is added at the rate of three pounds for each thousand pounds of milk. The salted curd is then packed in cheese molds and placed in a cheese press where it is left overnight. When removed, the curd has taken the shape of cheese. After being exposed to the air for three days the cheese is dipped in paraffin. Each day the cheese is turned to develop an even rind. Each cheese is weighed individually and the weight is stamped on the box. The better quality and more tasteful cheese is that which has been allowed to ripen for about six months.

The Borden Company has shown great foresight in establishing a source of supply near the point of consumption and placing that source in capable hands. The manager of the Chester plant, Mr. A. E. Vaughn, is well qualified for his position. He is experienced in all phases of this work and is a specialist on evaporated milk. He and his capable staff will undoubtedly develop this new South Carolina agricultural industry until it occupies a major place in the agriculture of this state.

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# *It pays to keep* "PLUGGING AWAY"



**W**E ALL know the story of the two prospectors who dug and dug for gold and then quit—*just three feet short of one of the world's richest lodes*. It's a story that carries a powerful moral—never quit until the goal is reached.

In the engineering and experimental laboratories of the thirteen great John Deere factories are men who are pledged to follow that same principle . . . men who are engaged in designing, testing, improving, and re-testing new farm equipment . . . men who keep "plugging away" until the final answer is achieved.

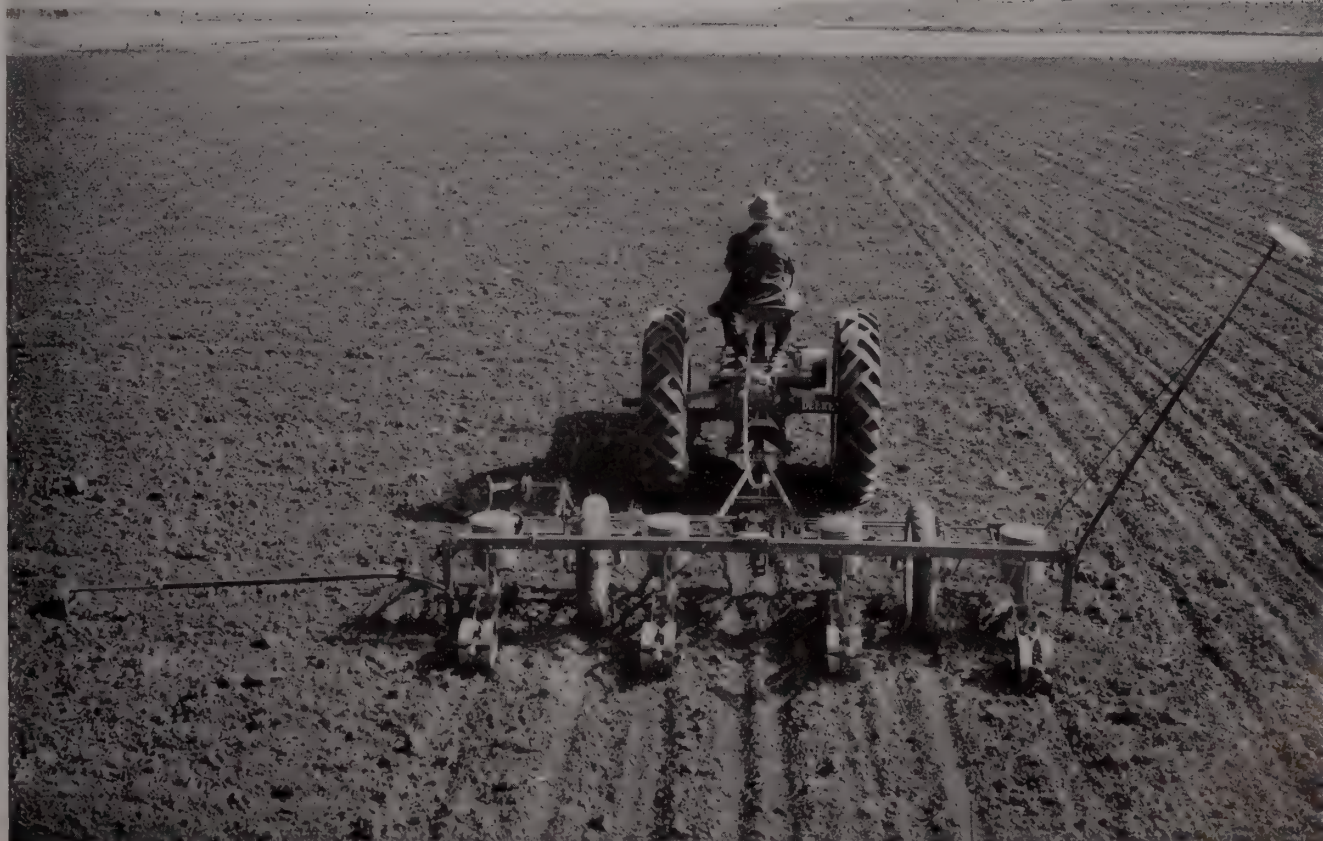
The new John Deere No. 490 Planter, shown below, is just one of the many new and better machines that John Deere has developed for 1941. Its unfailing accuracy in checking corn at a new high speed of 5 miles an hour cuts planting costs to rock bottom and enables the farmer to get his seed safely in the ground when the field and weather conditions are right.

The No. 490 is typical of the constant progress that John Deere is making in providing the farmer with improved equipment to lower his costs, speed up his work, and enable him to handle his farm jobs easier and better than ever before.

**JOHN DEERE**



**MOLINE, ILLINOIS**





"YOU SAVVY  
QUICK,  
SOLDIER!"



DAD ought to know. Look at the wall behind him. Photo of Dad, straight and proud in old-style choker-collar blouse, Sam Browne belt, and second "looie's" gold bars. And his decorations—the Order of the Purple Heart, Victory Medal, Croix de Guerre *with* palm.

"You savvy quick, soldier," he says to his son as that chip off the old block in the new uniform proffers Camels. "These were practically 'regulation' cigarettes with the army men I knew. Lots of other things seem to have changed, but *not* a soldier's 'smokin's.'"

Right! Today, and for more than 20 years, reports from Army Post Exchanges show that Camels are the favorite. And in Navy canteens, too, Camel is the leader.

Just seems that Camels click with more people than any other cigarette—whether they're wearing O.D., blues, or civvies. You'll savvy, too—and quick—with your first puff of a slower-burning Camel with its extra mildness, extra coolness, and extra flavor, why it's the "front-line" cigarette—past, present, and future!

THE SMOKE OF SLOWER-BURNING CAMELS GIVES YOU  
EXTRA MILDNESS, EXTRA COOLNESS, EXTRA FLAVOR AND

**28% LESS NICOTINE**  
than the average of the 4 other largest-selling cigarettes tested—less than any of them—according to independent scientific tests *of the smoke itself*

● What cigarette are you smoking now? The odds are that it's one of those included in the famous "nicotine-in-the-smoke" laboratory test. Camels, and four other largest-selling brands, were analyzed and compared . . . over and over again . . . for nicotine content *in the smoke itself!* And when all is said and done, the thing that interests you in a cigarette is *the smoke*.  
**YES, SIR, THE SMOKE'S THE THING! SMOKE CAMELS!**

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PER PACK!**

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# *The* **Agrarian**

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



STATUE OF THOMAS GREEN CLEMSON

OCTOBER, 1941

CLEMSON, S. C.





# Only Firestone

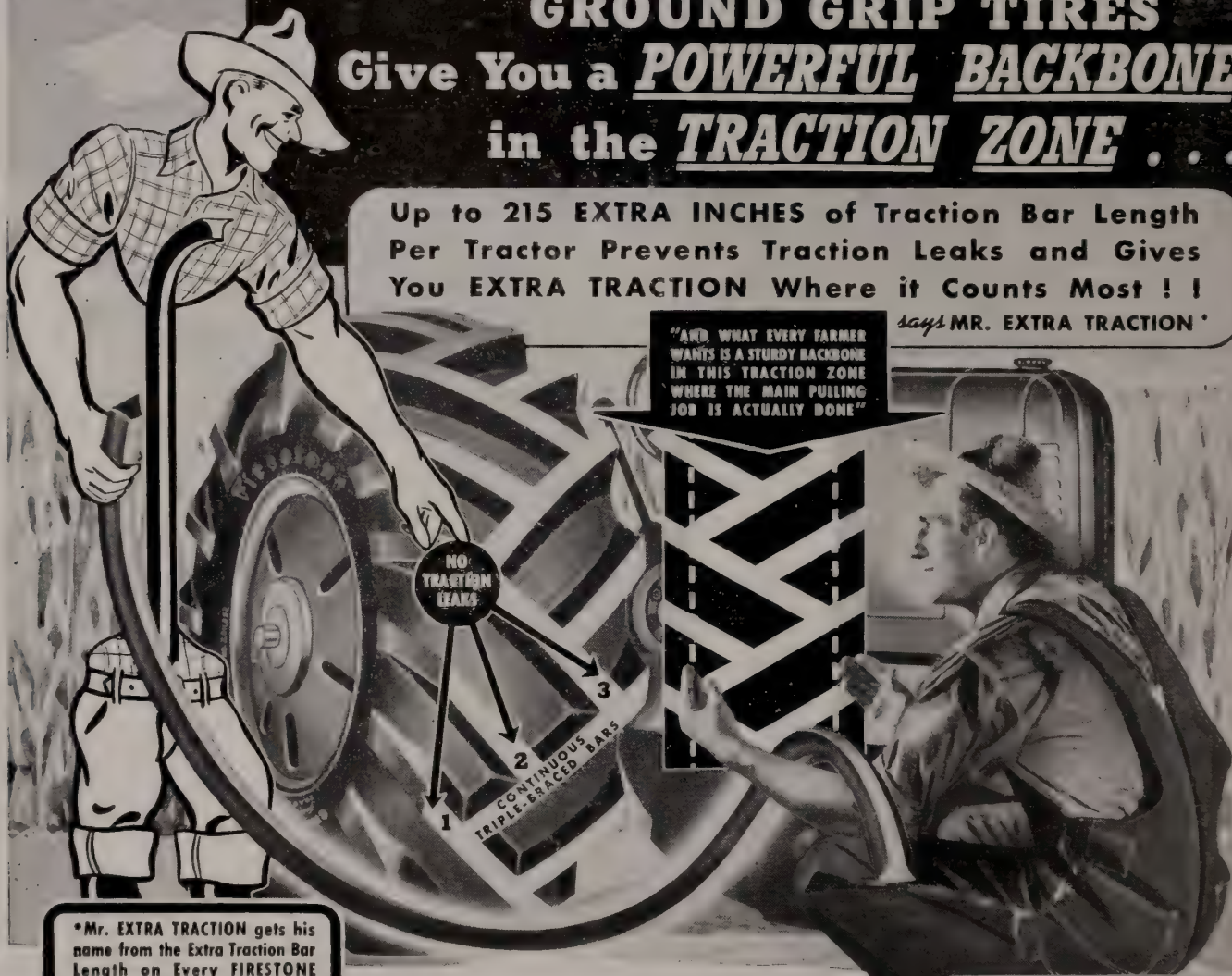
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### Give You a **POWERFUL BACKBONE** in the **TRACTION ZONE** . . .

Up to 215 EXTRA INCHES of Traction Bar Length Per Tractor Prevents Traction Leaks and Gives You EXTRA TRACTION Where it Counts Most ! !

says MR. EXTRA TRACTION \*

"AND WHAT EVERY FARMER WANTS IS A STURDY BACKBONE IN THIS TRACTION ZONE WHERE THE MAIN PULLING JOB IS ACTUALLY DONE"



\*Mr. EXTRA TRACTION gets his name from the Extra Traction Bar Length on Every FIRESTONE GROUND GRIP TIRE

**T**HIS is the time of the year when wet, slippery fields require the utmost in traction. It takes something "extra" in a tractor tire to provide this necessary additional traction. And it's the "extras" in Firestone Ground Grip Tires that enable them to out-pull, out-clean and out-wear any other tractor tires made. Consider these facts:

#### Extra Values That Provide Extra Traction

You get up to 215 extra inches of traction bar length per tractor — a powerful, sturdy backbone in the center of the Ground Grip tread. This avoids costly traction leaks common to broken bar treads. That's why the patented Triple-braced Tread provides greater traction and uses less fuel.

#### Extra Values That Provide Better Cleaning

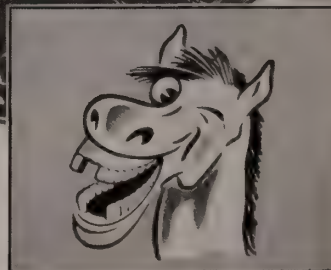
The spaces between Firestone Triple-braced bars are wide and

extend past the center of the tread. Dirt and trash are automatically forced out at each revolution of the wheel. There are no broken end bars to clog with trash and mud, causing slippage and loss of power. That's why the Firestone Ground Grip tread is the best cleaning, most efficient traction tread.

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Unbraced traction bars bend, wobble, wipe and in some cases tear off. Even the heaviest going cannot bend Firestone Triple-braced traction bars. That's why they retain their sharp biting edges providing longer wear. And the new weather-proof, wear-resisting Vitamic rubber protects against sun and barnyard acids.

When you buy a new tractor or changeover your present steel-wheel tractor, be sure you get Firestone Ground Grip Tires.



Old Dobbin laughs every time he hears anyone say, "An open center gives a better bite"

INCREASE YOUR FARM PROFITS.  
SEND FOR THIS FREE BOOKLET  
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# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 4



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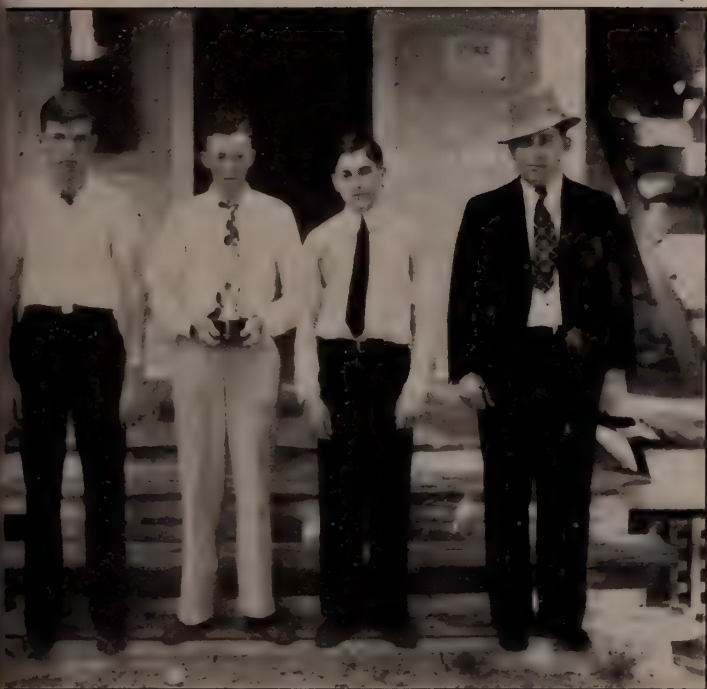
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# Is Farm Youth Deteriorating?

By S. K. ABLE, '42

*Of all our nations assets none are so valuable . . . so irreplaceable as farm youth.*



Courtesy of S. C. EXPERIMENT STATION.  
The leaders of tomorrow—the youth of today.

(AUTHOR'S NOTE: During these trying times there have been numerous charges that American youth has gone soft, has become weak and indolent. This article, written editorially, is a defense of the farm youth of America. The author, during the National FFA Convention in Kansas City, Missouri, had ample opportunity to meet and observe youngsters from all parts of the nation and from all walks of life. The following are the author's impressions and compose his answers to those who would condemn our FUTURE AMERICANS.)

The Future Farmers of America, national farm youth organization, is probably the only one of its kind in the world. It is one of the largest organizations in the United States, covering forty-seven states, Alaska, Hawaii and Puerto Rico. The group which met at Kansas City, Missouri, in October was typical—typical of Young America today. They are tomorrow's citizens. It is to them the older generation will leave the glorious heritage that is America. It is to them the nation will look for protection in the next few years. How will these boys, many of them yet to take their first shave, stand up to this responsibility? Or maybe it is not so much a responsibility as a challenge. After meeting these fellows, talking with them, seeing them in action, there can be but one answer. They will never shirk, they

will overcome their obstacles, kill their Goliaths and emerge with their heritage safe and the great American smile on their face.

During the entire week-long spectacle of American youth in action there was no sign of weakness nor the slightest evidence of any lack of ambition on the part of any boy present. Each one had his own ideas, his own plans, goal and convictions. None missed an opportunity to express his feelings. This was democracy in action.

Cooperativeness is one trait which the FFA strives unceasingly to develop to the fullest. The growth of this spirit of group work can be well illustrated by the work of the Michigan State FFA band. There are sixty-four musicians in this band and they come from fifty-four different chapters of the FFA. This band played as well as any group of amateurs could and gave several nationwide broadcasts during the convention. Had it not been for this spirit of cooperativeness in the boys, this band would not have been possible. It is 'oo bad that adult America cannot realize the need of this spirit, especially in times of national stress.

The Nyes, Lindberghs and Wheelers of the United States could well afford to take a few lessons in patriotism from these farm boys, for in their ceremonies and other activities there is always a note of deep feeling for their native

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Courtesy of S. C. EXPERIMENT STATION.  
Boys like these aren't soft . . .



# Science in Agriculture

*This broadcast is so informative, so searching, it adds stature to any publication.*



There is no problem here. Well bred animals on good pasture.

We have as our guest today a gentleman who is well known to Clemson men past and present. He is the author of two books which are highly regarded by agricultural colleges over the country—one on cotton and one on commercial fertilizers. Recently he was chosen by a large publishing firm to serve as editor of their series of textbooks on various agricultural subjects. He has for many years been a student of agricultural problems in South Carolina, particularly those problems related to soils, and is, therefore, well qualified to offer advice on the topics of today's broadcast, **Pasture Problems**. His Virginia accent, his air of assurance and his dignity have conspired to give him, among his students and associates, the title of "Lord."

He is Professor of Soils in the Clemson School of Agriculture and we are glad to have on our program today—Dr. Gilbeart H. Collings, familiarly known as Lord Collings.

In recent years no farm problem has been of greater general interest to farmers of South Carolina than that of securing good permanent pastures. One of many farmers interested in good pastures is our friend Bob Williams of Anderson County, who is a cotton farmer but who would like to raise more livestock. Mr. Williams has come to Dr. Collings for information—

Williams: Dr. Collings, during the last few years cotton farmers have been urged to diversify and to grow more livestock and other crops besides cotton. I have been wondering to what extent South Carolina Farmers have followed this recommendation?

Collings, Mr. Williams, South Carolina farmers have realized for a number of years that they were growing too much cotton and not enough livestock. Leading farmers in the state have long advocated more diversification and this doctrine has been concurred in and helped along by the various activities of the United States Department of Agriculture and the South Carolina Experiment Station and Extension Service. During the last ten years, the acreage for cotton in South Carolina has had to be reduced by about 800,000 acres. During the same period, the acreages of food, feed and hay crops have increased about 1,000,000 acres. So you see the land that has been taken out of cotton production has been diverted to the production of soil conserving and feed crops. This adjustment of production is believed to represent real progress and this change in farm practices is already doing much to help produce a better farm life on many South Carolina farms.

Williams: I know what you say is true because I have noticed this change in my community but I don't believe farmers yet have enough stock. I know I don't.

Collings: You are right, Mr. Williams. We need much more livestock and poultry in South Carolina, but while we are getting more livestock we must increase our acreage of improved pasture or we will not be able to maintain the livestock. We all know that on many cotton farms the area on which the stocks is turned to graze and which is called a pasture is no more than an exercise lot.

Williams: It looks like in spite of everything I do my pasture dries up every summer. I would be in a bad fix if I didn't have some bottom land to graze. Dr. Collings, why is it so hard to make and keep a good pasture?

Collings: Mr. Williams, yours is a common experience. Pastures are not as easily secured in South Carolina as they are in the so-called livestock regions of the United States. For one thing our soils are timber soils; that is, when these soils are abandoned they naturally grow up in timber just as the soils of the western prairie county naturally produce grass. Of course, our soils can be made to produce grass but when we put grass on a piece of South Carolina land we are going against the current, we are working

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# An Editorial

By EDWARD P. HUGUENIN

Editor-In-Chief

Since Reconstruction (which has not entirely ended yet) the South has remained as solidly unipartisan as it was before the Civil War. The large landowners, before the war, decided that it was for their best economic interest to act as a unit, and this was the beginning of the "Solid South." Since the end of the war the dominant political group has felt that all white men must stand united, or submission to the negro would be the result. A large number of our politicians have used this fear of negro domination as a tool to gain office, it is sad to say. The effects of this concern are readily seen in our civil and political policies today. The colored man has been continually striving to come into his own, politically; and the southern legislators have been equally active in preventing even a vestige of "Negro Domination" to occur. The negro was (and still is) excluded from the Democratic primary which is paramount to election in most of the South. Therefore the few who have been allowed to register have been, obviously so, solidly Republican, and it follows, that the whites would be solidly Democrat in order to maintain their supremacy (in the event that negro suffrage becomes a serious threat). This political situation has been of inestimable harm to the entire nation.

As long as the South is forced to vote "solid" no political justice can be secured, nor can statesman-like policies be initiated for the good of the country. For years the latent, but ever-present potentialities of the negro man have had an important influence on the thought and legislation of the southerners. There can be but little independent thinking because this would mean division, and division, in the minds of too many of our leaders would be ruin. Obviously we can never reach our maximum political and moral strength with almost one-half our people subservient. (**The white mans foot is on the neck of fifty percent of our people**). To keep a man down in a ditch, one has to either get in the ditch too, or stay so near the brink that there is the ever present danger of being pulled in.

This problem isn't one to be solved by crackpot theorist, or a bunch of useless committees. So long as any group or minority isn't given an equal chance, no other group or minority is free, because there is the ever present danger that the persecution might be extended. This old-fashioned, Archaic, and un-American situation will have to be solved by the southern youth. At present there seems no better solution than "As ye would have others do unto you, do ye also unto them."



# Does It Pay?

By J. N. FROWEIN, '42

*Our farmers must produce the best . . . . .*



Courtesy of S. C. EXPERIMENT STATION.

Properly graded . . . . . attractive

Suddenly there has been a boom in preparing for national defense. Machinery has been running at maximum speed, and men have been working overtime in order that the United States may secure more equipment to give its thousands of young men better training in every way possible in uses of each type of weapon.

It has been stated that the large manufacturers have been profiting from increased production, the middleman has been making too large a sum of money from his buying price and selling price. Are the farmers going to stand by and let the middleman grow rich at their expense? What are the limitations of the farmers' control?

Good wholesome food is essential for any soldier to do his best in the defense training problems. Where will this food come from? The United States army officers realize just how important good food is for their men, and they say that their army will eat the very best. Ask the boy who used to grease your car, the son of your family doctor, or that young man who used to tackle the bar exam—. Ask any of the lads you know next time he is home on leave. He will tell you that the U. S. Army eats good food. Certainly no part of preparedness is more important.

And, to realize how big a job food is, consider that the quartermaster provides 12 ounces

of meat, 10 ounces of bread, 8 to 10 ounces of vegetables, 6 to 8 ounces of fruit, a half pint of fresh milk, 5 large cups of coffee, plus eggs, butter, and condiments to every man every day.

Will the farmers of this state permit the manufacturing companies to sell everything to the army, thus benefitting by a few dollars themselves?

Camp Croft located at Spartanburg and Fort Jackson in Columbia, feed around 91,000 men three times a day. Mess diets vary from day to day and almost every farm product is used at some time throughout the week.

If the farmers ever hope to supply the army, they must do it through some sort of organization that can meet a year 'round demand on a quality basis. Farmers drive up to camps and try to sell apples, carrots, cabbages, eggs, etc. The army does not want them that way. They must be graded according to federal standards. They do not want them just at the peak of the season when prices are fancy. Contracts are made on a monthly basis and they have got to call in these—rain, shine, or Hitler.

Purchasing is done by competitive bidding for everything over \$500. The goods are bought on federal grades so that producers can be intensively educated in meeting these standards. Perhaps a farmers' cooperative organization would be the best way to get started in this food supply business.

A good farmers' cooperative could compete with any business dealer or wholesale dealer in the state. A cooperative could be formed if the farmers would be willing to work together. If a cooperative is formed for this purpose, the farmers should be able to soon get experts to manage, grade, and sell their products at a large profit, and also they could buy supplies for their various farm needs at a reduced cost, thus helping the farm income. A marketing enterprise of this nature could be nothing but successful.

"In producing these cooperatives, better markets for fruits, vegetables, eggs, meats, etc., should give stimulus toward improved methods of producing, grading, and marketing, of permanent advantage to agriculture."

# Unlimited Possibilities . . . .

## GUEST EDITORIAL

*We have but to look around us to see our possibilities . . .*

South Carolina is a great State and has almost unlimited possibilities for further agricultural development.

Practically everything that grows in the temperate zone can be produced profitably in this state and many of the subtropical plants do well. Her farmers are intelligent and instinctively thrifty.

Cotton, tobacco, hay, fruits, vegetables, grains are the principal crops and these with poultry and livestock can be made to bring more money to South Carolina farmers if all will use better farm practices.

The farmer's main object agriculturally, is to raise from a given area of land the best quality and the largest quantity of the most valuable produce at the least cost, in the shortest period of time, and still improve his soil.

If he succeeds in doing this, his standard of living will almost automatically take care of itself.

There are a number of agricultural agencies and publications working with farmers and each is working, in its own way, towards a better agriculture for South Carolina and the resultant better life for her agricultural people.

Agricultural programs and policies of all groups should be so arranged and planned to stimulate and encourage individual initiative—THE AMERICAN WAY—! Care should be taken that "help for the farmer" is not the kind that makes him dependent on outside aid, because many farmers, like the rest of us, will accept income from government funds as a substitute for income earned the hard way.

Mighty few people, on or off the farm, gain success the easy way. Hard work and some sacrifices are the old and still true formulae.

Programs may make good reports on money dished out to support movements but these cannot be called successful until farmers themselves have improved their economic condition suffi-



J. Roy Jones, State Comm. of Agriculture

ciently to keep their activities self supporting. It is also possible some of this government aid may stop—and then what?

Agencies, no matter how well manned, nor how well their programs are planned, cannot accomplish much without the hearty help and co-operation of the farmer himself. Do you know of any man who lifts himself by his own boot straps?

To make South Carolina agriculture reach its desired goal, to make all South Carolina farmers self supporting—there are still too many who are not—will take the combined and sincere efforts of the farmers first and all who have

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# Soil Depletion--A Major Problem

By R. N. GLEASON, '42

*Our soils must not be treated as they have been if they are to keep up their maximum production.*



Courtesy of S. C. EXPERIMENT STATION.  
Legumes are one way to conserve our soils

The soil in the South has been greatly depleted because of the system of farming. Soil depletion is no simple process. It results from the actual removal of topsoil or from the breakdown of soil structure and extraction of chemical elements from the soil. Erosion by wind or water removes the entire body of the soil; methods of tillage and rotation also have an important effect upon soil structure and crops are removing gradually the elements of fertility from the soil.

Until the Soil Erosion Service, which later became the Soil Conservation Service, was established in 1933, there were no public policies for dealing with the menacing problems.

In 1937 nearly 4 million farmers were given benefit payments for soil-conserving practices. This money was used by many of the farmers for planting soil-conserving crops and constructing terraces.

In the so-called Dust Bowl in the Southern Plains, 6 million acres of land was subject to severe wind erosion in 1935 and 1936. Surveys made in 1939 show that less than 1 million acres of this same area is still subject to severe blowing. This is one of the most striking examples of a successful effort to stop soil depletion.

One of the most important measurements of soil depletion is expressed in terms of crop yields. Only the increased costs of production due to the purchasing of commercial fertilizers have maintained crop yields in the face of declining soil fertility.

Soil erosion is the most easily recognized of the soil depleting forces. It has been estimated that three-fourths of the original surface soil has been lost or over 50,000,000 acres of crop-land. The 1935 census reported that 75 percent of the cropland area of U. S. was in need of conservation practices.

Factors governing the transportation of soil by rain water are: slope of land area, soil type, kind and amount of vegetation, and amount and intensity of rainfall. Erosion by water is a progressive process, intensified by cultivation and over grazing and sometimes by burning. The removal of plant-food constituents by cropping and grazing is relatively small when compared to the removal by erosion.

Soil depletion by erosion is consistently heavier on land planted to a clean-tilled crop year after year than on cropland areas under a good rotation; and soil losses from fallow land bare of vegetation are uniformly much greater than from land in grass or trees.

There are many thousands of acres in the South now lying idle and subject to erosion that could profitably be seeded to good cover crops. Cover crops prevent soil erosion in two ways—while the crop is growing, the soil is protected from the impact of rain and the run-off is retarded; when the cover crop is turned under as green manure, organic matter is added to the

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# Dairying Equipment and Methods

By EDWIN B. COLLINS, '43



Courtesy of S. C. EXPERIMENT STATION.

## A Concrete Sterilizer on the Farm

The best equipment available is an indispensable asset to the modern dairy products plant. The high labor cost which is prevalent throughout the United States would make operation unprofitable for dairying industries were it not for the great strides which have been made by manufacturers of dairying equipment. Were labor cheap, the absence of modern equipment would make it impossible for plants to process large volumes of milk. Because of the perishable qualities of milk, bacterial counts would be high.

The public health in general would be greatly endangered because of the dairyman's handicap. Modern knowledge of Bacteriology would be true only to be read about in books, and a primitive industry would be striving against unconquerable odds in a modern world.

In the modern dairy plant the story is entirely different. Thousands of gallons of milk can be processed during a day's time. Unbelievable, but true, man's most perfect food, full of life dealing energy, vitamins, and minerals, can be passed from its source to our table, without touching the human hand. Vacuum milker, holding tank, and bottle filler help to pass milk into your bottle free from contamination. Refrigeration, which makes the dairying industry possible, proves itself to be the consumer's greatest friend by keeping the wholesome product amazingly fresh until it reaches his front door.



Courtesy of S. C. EXPERIMENT STATION.

## One Result of Sanitation—Good Food in Pleasant Surroundings

Though nearly all dairy equipment is made of stainless steel, all efforts towards a wholesome product are fruitless unless sanitary methods are used. While milk is the best of all foods for man, it at the same time meets all the requirements of a perfect medium for bacterial growth. Though the best modern equipment is used, it is impossible to produce a good quality product while using dirty equipment. A modern "flash" pasteurizer has fifty or a hundred joints of pipe to be taken apart each time the pasteurizer is cleaned. These joints must be taken apart, scrubbed, and replaced every day after the equipment has been used. One of the problems in dairy plants is the employing of men who can be relied upon to do their duty under such circumstances.

The laboratory of a dairy plant is continually on the watch for any defects in the quality of the plant's output. Many tests of different kinds are run several times each day so as to catch any defect at its beginning. The laboratory in a certain dairy plant last summer began to find high bacterial counts in the plants, chocolate milk. Upon investigation, it was found that the pipes and cans used in making the chocolate milk were not being properly sterilized with chlorine disinfectant. As soon as the situation was corrected, low bacterial counts were again found in the laboratory.

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# Cooperatives by Jack Schaffer '43

A cooperative is a voluntary business organization established for the purpose of collective marketing. It is owned and operated by the member patrons. It is amiable to the economic forces but not all the traditions, codes, and practices of privately owned enterprise.

Cooperatives differ from private business by the interests that motivate its organization. A business corporation's main objective is to get as large a return on the capital invested as possible, but a cooperative's primary objective is to give the member patrons efficient service for their direct benefit. A cooperative has limited interest on capital, usually 6 percent, while private business has unlimited interest on money invested. The method of voting is far more democratic in a co-op where each member has one vote while in private business each share of common stock counts as one vote. In a co-op no proxy voting is permitted. A co-op favors any who are willing to buy or sell, while a private business favors only a select few. A cooperative distributes the profit according to the amount of business a patron furnishes, while a corporation shares profit according to the amount of stock a member holds.

Cooperatives pool the buying power of their members in order to buy in quantity and thus enable them to get products at a more reasonable price, and they provide financing, insurance, housing, and utility services such as rural electrification. They may have machinery to loan their members at planting and harvesting time.

Cooperatives have been misunderstood and fought by vested interests. It has had some terrible failures due to poor organization. It has been accused of being a monopoly when in reality it is just the opposite of a combination in restraint of trade.

The first known co-op was a creamery in Goshen, Conn., in 1810, and in 1844, some Wisconsin farmers made cheese collectively. In 1851, some farmers in Rome, N. Y. manufactured cheese by the so-called "American System." In discussing co-ops, most people think of Rochdale. This co-op which is still in existence was organized in the small town of Rochdale, Eng. It was made up of weavers who found that their only hope of survival was to buy collectively.

During the next forty years, cooperatives were in the experimental stage. Many were or-

ganized, literally overnight, and disbanded in a very short time. This period was the testing ground of co-ops. The year 1880 is considered the turning point of the cooperative movement. Since that time, we have had some large and successful co-ops. In California, the fruit growers do a \$100,000,000 dollar business a year. The dairymen of New York do an equally as large business. Throughout the nation, there are thousands of co-ops that sell insurance, extend credit, market raw materials and buy for the consumer.

Denmark is usually cited as the foremost example of successful nation of cooperation. She is a small country and far from wealthy but by producing butter, eggs, bacon, and ham and marketing these products cooperatively, she has been able to survive. She has set a high standard of quality that sells at a premium price. She had to start marketing cooperatively when Prussia took a goodly portion of her farm land away. It was one of the first acts of Junker imperialism which to this day has not been abbreviated. This left Denmark without any means of livelihood, and she had to intensify production.

About one-half of the agricultural goods marketed in the U. S. are through co-ops. Cooperatives are a major social outlet in many communities. Without them our whole economic structure would undoubtedly be changed. The farmer's and consumer's dollar would not stretch as far as it does without them.

Cooperatives are of many types and purposes. There are cooperative sales or marketing organizations which sell farm products that are produced individually on the farms of the members. The processing, packing, storing, financing, and bargaining is carried on by these organizations. There are co-op purchasing organizations that pool the buying power of the members but sell both to non-members as well as members.

The cooperative picture should not be painted completely rosy in color because it isn't by any means. Many farmers do not like to have anyone market their produce but themselves. To some farmers, marketing is the most exciting chapter of farming. This desire on the part of farmers to keep their individuality has caused many co-ops to fail. Some co-ops are overpromoted. The farmers themselves should express the desire to form a co-op, to high-pressure salesmen.

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# Better Bulls--More Profit

By G. W. EDWARDS, '42



Courtesy of S. C. EXPERIMENT STATION.

**An excellent beef herd sired by a good bull**

One of the great needs of South Carolina's agricultural progress today is the improvement of its beef cattle. Therefore, in our state there is room for vast improvement in our present commercial herds. This can readily be realized at the auction markets by the noticeable discriminations that the buyers place on the off type or non-beef type cattle. This results in a sizeable loss to the beef producers of the state each year.

Purebred or good grade beef steers weigh more for their age and make more economical gains on the same feed; also, they are much higher in quality and sell for more per pound than do off type or scrub steers. This makes it very easy to see why desirable cattle demand a higher price at sales and return more profits to the producers.

The quickest and most economical way to correct this situation is by the use of good bulls in our herds.

Selecting a good bull is very important to the beef producer. The chief problem is locating an animal which has been proved to be superior. Any time that is used to locate a good bull is well spent. Many breeders buy cheap bulls because they are more economical to purchase but actually the most expensive thing in beef cattle production is a sorry off type bull. Good bulls reap many profits and in the long run are much more economical than cheap ones.

When buying a bull, let a mental picture of a superior animal remain constant in your mind. Do not buy the first bull that you see but study

many animals before making a selection. However, it is almost impossible to find a perfect bull. The animal that you select should be strong in the points where your cows are weak, thus giving you a higher quality offspring that has more beef qualities than your cows.

Most cattlemen tend to want large bulls; nevertheless, a bull of medium size is more valuable to the average breeder than an unusually large one. Along with size some other general characteristics that should be kept in mind when selecting a superior animal are well developed hind quarters, good width of rump, great spring of ribs, shortness of legs, shortness of body, great depth of body and straightness of legs. An animal that does not have all or most of these characteristics is likely to do damage to your herd.

Even in the first offspring the qualities of a good bull are very noticeable. By selecting the best heifer offspring and using these for breeding stock the herd will be gradually improved. In a few years a reasonably good grade herd can be acquired by this method. Over a number of years this would greatly improve the beef herds, increase the farmers' profits, and stimulate much interest in beef production in our state.



Courtesy of S. C. EXPERIMENT STATION.

**Competing with the best—a result of good breeding**



# Cotton--Weather Research

By C. B. FELLERS, '43

There are five cotton-weather research projects in the South. They are located at Pee Dee Experiment Station, Florence, S. C.; Georgia Experiment Station, Griffin, Ga.; Delta Experiment Station, Stoneville, Miss.; Cotton Branch Experiment Station, Marianna, Ark.; U. S. Dry Land Field Station, Lawton, Okla. One of the main objectives of the cotton-weather experiments is to study the effects of variable weather conditions on growth, fruiting and production of cotton. To obtain this objective it is highly essential not only to make accurate and timely weather observations but also to make accurate and timely plant observations. With a minimum of sampling error, as well as actual error, in measuring the two phenomena, the actual relation between plant characteristics and weather is more readily observed.

Within a growing season at one location, weather variations may be roughly divided into three groups or cycles. The first source of variations comes from normal fluctuations within each twenty-four hour period. Changes in temperature and humidity usually follow a fairly definite pattern throughout the day. The next source or cycle of variation in weather is associated with "highs and lows" that vary both as to intervals between occurrence and duration. These indefinite cycles account for considerable variations within seasons. The third source of variation is made up of seasonal changes that are associated with spring, summer and fall. During the summer months "highs and lows" are not responsible for as much variation in weather as in winter. Conventional and tropical storms are characteristic of summer weather and account for considerable variation in rainfall. Aside from the effect of rain falling during thunder showers, the crop weather experiment is designed to measure accurately the effect of fluctuations of weather occurring within one day. The effect of general changes within seasons and between seasons is easily observed over a period of five years.

The following observations are made of the environment in which the plant grows: relative humidity, maximum and minimum temperature, evaporation, rainfall and soil moisture. The re-

lative humidity is observed three times daily: 8 A. M., 1 P. M., and 5 P. M. A sling psychrometer, consisting of a pair of thermometers, is used for determining the relative humidity. Maximum and minimum temperatures are recorded daily. To obtain the amount of evaporation white atmometers are used. In measuring the amount of rainfall, a standard rain gauge and a recording gauge are used. The recording rain gauge records the time, velocity and duration of each rain. Soil tensiometers are used for observing soil moisture.

In the experiment there are four varieties of cotton used, namely: Oklahoma Triumph, Stoneville 2B, Dixie Triumph, Shafter Acala. There are two plantings; a late and a normal planting. The experiment is so designed that each of the 32 plots contains one third of an acre. Four samples of five linear feet within each plot are used for making height measurements and various fruiting counts. Square counts and boll counts are made weekly. When the cotton begins to flower, the blooms in the samples are tagged with the date of their blooming. As the season progresses, the shedding of the young bolls are accounted for.

The basis of the experiment came from this: weather factor—plant characters—yield and quality. Over a five year period the bureau of Agricultural Economics is trying to eliminate the middle term. In other words, when there are certain weather conditions given the yield and quality of the crop can be predicted at once. One can easily see the value in an equation of this kind. It will be of great importance to the farmer as well as to the business man.

## College Cafe & Sandwich Shop

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Owner

# Dr. H. T. Polk

Associate Agronomist of S. C. Experiment Station



At his desk



In his office

Dr. H. T. Polk, Associate Agronomist of The South Carolina Experiment Station at Clemson, received his B.S. in chemistry from the University of Kentucky in 1931. After graduation he worked for a while in The Chemistry Department of The Kentucky Agricultural Experiment Station before taking up graduate work. In 1938 he received his Ph.D. from Cornell having majored in Soils.

In September 1938, he came to Clemson College and has been connected with the Agronomy Department of the Experiment Station since that date. Dr. Polk is doing research work in Soils and Agronomic investigations and helps with the soil testing for fertilizer and lime requirements.

Dr. Polk says that there is an increasing interest being shown in the soil-testing service conducted by the Agronomy Department. This is

evidenced by the almost daily arrival of samples throughout the entire year and the marked increase in the number of samples received from year to year. During the past year, about 12,000 soil samples were sent in for various analyses; as compared with 5,446 in 1938, there were only 1,838 samples received in 1937.

Dr. Polk and co-workers make the kind of tests that are requested by the individuals submitting the soil samples. An acidity determination, as expressed by the PH value, is made on all samples. This test is used as a measure of the lime needs of the soil. Tests for available phosphorous and potassium are made where fertilizer recommendations are desired. Soil samples are also analyzed for manganese and magnesium

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## Oriental Fruit Moth

By ORDWAY STARNES, '42

The Oriental fruit moth was first officially found in South Carolina in 1928. Since that date infestations have increased to such an extent that at present it is the predominating pest of the commercial peach orchard. Peach twigs and fruit appear to be the preferred food, but practically all orchard trees are susceptible. Infestations have been found on quince, plum, apricot, cherry and nectarine twigs, also in fruits of apple and pear. There is uncertainty as to the origin of the Oriental fruit moth as it occurs in France, Italy, Japan and Australia. The earliest record of its occurrence was in Japan in 1908.

In its development the Oriental fruit moth passes through four distinct stages. These are egg, larval, pupae and adult. The eggs are grayish white ovules of about one thirty-fifth of an inch in diameter. These are usually found on the under surfaces of the young tender leaves of the terminal twigs. Incubation time varies directly with temperature, but is usually from three to ten days. The larva upon emerging are about one thirteenth of an inch long. It is in this stage that the damage is done as the larva enters the twig at the base of the leaf and barks down as much as four inches in some cases. The larva may pass the entire stage in one twig or may enter another twig or a fruit. The twig seems to be the preferred fruit and until it ceases growing and hardens little damage is done to the fruits. Twigs which are infested usually have one or more wilted leaves, later the end of the entire twig dies and as the branch grows it takes on a characteristic bushy appearance. This larval stage lasts for about ten days varying with temperature and abundance of desirable food. When grown the larval are pink and about three-fifth of an inch long. Then it emerges and pupates on the leaves, bark, or fruit by spinning about itself a silky cocoon wherein it becomes shorter and thicker. In the early or mid-summer the adult will emerge, but if pupation occurs in the late summer the moth will hibernate over winter in the pupal stage. There are usually six generations per year, of these about one-half hibernate.

No poison has been found that will efficiently and economically control the oriental fruit

when plant symptoms indicate that there may be a deficiency of these.

Dr. Polk says that about 80 percent of the samples received are by far too acid for best plant growth. These acidity determinations indicate the importance of a liming program in South Carolina. About one-half of the soils tested show high requirements for phosphorous and potassium.

It is believed that such a testing service as is carried on by Dr. Polk and co-workers will play an important role in the establishment of a more diversified system of agriculture for South Carolina.

moth. Chemically treated lands have been used experimentally and proven to be of some value, however the most promising control appears to be parasites. In 1930 the South Carolina Experiment Station and Peach Growers Association began cooperating in an effort to control the oriental fruit moth. Several parasites have been successfully tried, among these are egg, larval and pupal parasites. Early parasitism in any stage is low, however this percentage increases rapidly during the season. Introduced parasites gave better results in 1940 than any previous season, the percentage of parasitism being as high as 76.6 percent, while the native parasite gave as high as 71.8 percent parasitism.

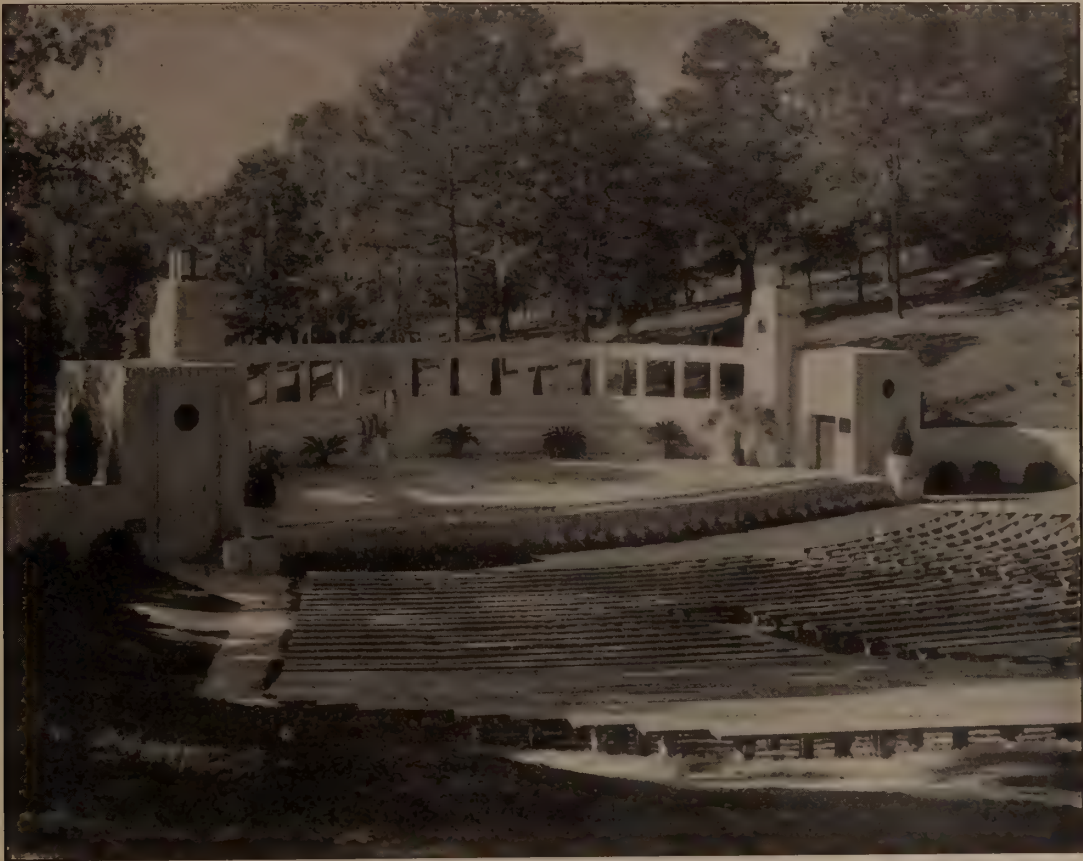
### CLEMSON COLLEGE ROADSIDE MARKET

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We sell over 100 varieties of peaches, and many varieties of apples, grapes, plums, cherries, raspberries, dewberries, pecans, cider and canned ripe yellow free-stone peaches in medium or heavy syrup.

Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits this season.

**THE HORTICULTURE DEPARTMENT**



THE CLEMSON AMPHITHEATER



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## BETWEEN THE

### Better Farm Living Train a Big Success

The livestock and better farm living train operated in South Carolina during September by the Clemson College Extension Service in cooperation with the Atlantic Coast Line railroad, according to Extension Director D. W. Watkins, was a big success. The eight-car train filled with exhibits and demonstrations stressed the various phases of better farming, including the importance of more livestock, made 45 stops in 32 counties. It thus gave the people in practically every part of the state an opportunity to see a moving agricultural fair that was highly educational.

THE AGRARIAN

### Stadium

That Clemson will at least have a new up-to-date stadium now appears to be a reality. The financial arrangements have been made and the surveyors have made their investigations. Actual work on the arena will be started this fall. The stadium will be built in the natural depression behind the field house in two parts, one part on each side of the playing field. It will be constructed so that in event of expansion, an additional section may be built. The stadium will then be in the form of a horseshoe. The present plans call for a seating capacity of twenty thousand people. Dressing rooms and showers will be built into the concrete structure.

The new stadium will enable Clemson to schedule more home games. The present stadium has been highly unsatisfactory in accommodating the football crowds.

THE AGRARIAN

### Sweet Potato Production and Marketing Meeting

A sweet potato production and marketing meeting will be held at the Edisto Experiment Station 3 1-2 miles from Blackville, South Carolina on the Blackville-Williston highway on Thursday, October 16. The Experiment Station and Extension Service staffs will cooperate in presenting the results of sweet potato experiments and the work which has been done on the marketing of this crop.

### Alpha Tau Alpha News

The new officers for the Alpha Tau Alpha are: J. T. Sherman, President, G. W. Butler, First Vice-President, H. L. Crouch, Second Vice-President, D. C. Herlong, Secretary and Treasurer, R. L. Bull, reporter. The Alpha Tau Alpha chapter is planning a big year. It is trying to get a room for meetings and social activities. Plans are to have a banquet this year and several other social events. As usual, Alpha Tau Alpha is going to give a prize to the sophomore with the highest grade point ratio at the end of the year.

THE AGRARIAN

### Dean H. P. Cooper attends meeting

H. P. Cooper, dean of the school of agriculture, attended a meeting of the Southern agricultural leaders called by the secretary of Agriculture in Memphis, the latter part of September. The purpose of the meeting was to consider agricultural planting in the South in view of defense measures and as a permanent program of increased consumption and production of food.

THE AGRARIAN

### Judging Team to Baltimore

The Clemson College judging team attended the livestock judging contest held in Baltimore, September 29. The Clemson cadets ran fourth in the group of contestants for the Eastern states. Preparations are being made for the judging team to attend the National Livestock Judging contest to be held in Chicago in November.

THE AGRARIAN

### Cheese

Roquefort cheese, originally made at Roquefort France, having a flavor caused by a blue mold is now being made in the old tunnel above Walhalla. Dr. P. G. Miller, associate dairyman manufacturer, reports that the first batch of cheese was a big success. More cheese is to be put in the old tunnel at regular intervals. The tunnel has been cleaned out and electric lights will be installed soon.



## FURROWS

Dr. H. P. Cooper, Dr. G. H. Collings and other members of the agronomy department will attend a convention of the American Society of Agronomy to be held in Washington, Nov. 12-15.

— THE AGRARIAN —

R. L. Arrington (class 1940), former president of the Dairy Club and member of Alpha Zeta, received his M.S. degree at V.P.I. last spring. Arrington is now on the dairy research staff at Clemson.

— THE AGRARIAN —

Alpha Zeta has begun a very active year. The first service rendered was in the form of an information booth for freshman on registration day. The next activity was an 'Ag. Mixer' held in the Agricultural Auditorium. All agricultural and ag. engineering freshmen were invited and many of the faculty were present. New members are to be taken in shortly.

— THE AGRARIAN —

Walker Gardiner, honor agricultural junior from Florence, won the \$250 second place Sears Scholarship at a national examination held during the summer.

— THE AGRARIAN —

### Marketing in South Carolina.

The sale price and assessed value of farm real estate in South Carolina over a period of more than 30 years is treated in a recent publication of the South Carolina Experiment Station released as Bulletin No. 334. The publication indicates the trend and the price of farm real estate over a period of years and shows the relationship of sale price to assessed value. Numerous inequalities are observed and analyzed. A copy of this publication may be had upon request.

— THE AGRARIAN —

### Alumni

Lewis D. Malphrus (Class 1938) has recently been made Program Analyst of Region V of the Farm Security Administration, with head-

quarters in Montgomery, Alabama. Malphrus received his master's degree from the University of Tennessee in 1940.

Ben W. Anderson (Class 1940) is at Fort Jackson.

Lloyd C. Martin (Class 1940) is at Camp Croft. Before being called in the army Loyd was a research assistant in the Department of Agricultural Economics and Rural Sociology.

Charles M. Aull (Class 1939) is with the Armored Division at Fort Benning. Aull received his master's degree from the University of Kentucky in 1940.

W. K. Bing, instructor in the department of agricultural economics and rural sociology at Clemson has been offered and accepted a fellowship at the University of Chicago where he will continue work toward an advanced degree.

Professor E. R. Hauser, instructor in the animal husbandry department, attended summer school at Iowa State College, Ames, Iowa.

J. E. Pace (Class 1941) is in Tala, Honduras, South America on a banana plantation.

W. J. Oates (Class 1940), graduate in agricultural engineering from Chester, S. C. has received his M.S. degree from Iowa State College. Oates is now a member of the faculty at Ames.

J. E. Cottingham Jr., from Dillon, S. C. and R. J. Berry from Smoaks, S. C. were awarded fellowships at Iowa State College, but they were unable to take advantage of the fellowships because of the U. S. Army.

Gilbeart H. Collings Jr., former graduate of Clemson, completed his graduate work at Emory University in the spring of this year. Recently he published an article in the S. C. Medical Journal entitled 'The Rural Medicine in S.C.'

Mr. David Ross Jenkins, Assistant Professor of Rural Sociology, attended the Agricultural Economics and Rural Sociology Conference at North Carolina State College during the summer, at which time he presented a paper entitled 'The Application of Scale in Levels of Living Studies.'



# The Winter Corn Crop

By L. C. HAMMOND, '42



Courtesy of S. C. EXPERIMENT STATION.

In many sections of South Carolina a not uncommon sight is the patches of mediocre and drought-stricken corn turning a stunted, pale, yellow color as the sun's rays, uninterrupted by clouds in the sky, beam down. The moisture in the soil from rain in months gone by is finally exhausted and the blades of fodder waving in the hot breezes curl up in a struggling effort for life. And life is about the only result, too, for in South Carolina the average yield of corn per acre is only 14 bushels. When, as often is the case, the per acre yield is lower, and with this average yield, hosts of southern farmers face the problem of having to buy their corn or limit the number of livestock kept on the farm. Improved farm practices can increase this average yield. However nothing can guard against the inevitable low yields of dry years.

Suppose we could find a crop to grow during the late fall, winter and spring months when the moisture supply is usually abundant, and that such a crop would produce grain of about the same feeding value as that of corn. Such a crop being discovered by more and more farmers each year is barley. "I grow my corn in the winter", is the casual comment of the barley grower. These farmers have found that they can grow barley with less labor, less danger of loss from drought and in the end have a per acre yield often exceeding that of corn. They have found that this grain closely approaches

the feeding value of corn, and that it sets up an excellent barrier to any feeding problem when the corn crop is short.

The South Carolina Extension Service estimates that an average South Carolina farm family maintaining the proper number of livestock requires about 300 bushels of corn each year. With the small average size of South Carolina farms, enough acres could not be planted to supply this demand in a bad drought year. So, to guard against such a gamble, why not sow a few acres of barley in the fall to supply a part of this 300 bushels of grain? In 66 demonstrations over South Carolina, the average yield of barley was 34 bushels per acre. Using this figure, it would take approximately five acres to produce enough barley to take the place of 130 bushels of corn. This five acres of barley would be more certain than the 130 bushels of corn in the summer. It would also provide a cover crop to control erosion on the soil which might otherwise be naked to the torrents of water during the winter months.

Barley, as a grain feed, is used somewhat differently from corn. In feeding cattle and horses it should not compose over half of the grain mixture, corn and oats being supplied with it. Barley can readily be given a strong position in the balanced ration of hogs and sheep. Its use is far from being limited to that of a grain crop. Winter grazing for cattle, and horses are some of its numerous uses.

As a southern field crop, barley has been grown for many years, but not very extensively. However, its culture is familiar with most farmers, and is little different from that of other small grains. Every Southern farmer who finds it difficult to supply his grain requirement should apply lime to a few acres of his soil and follow this with his grain drill and about 300 pounds of a complete fertilizer late in September or early in October. Then forget about plowing and getting the grass, and in the early spring just apply from 100 to 200 pounds of a nitrogen fertilizer over the green field and harrow a few times with the spike-tooth drag harrow. Behold! The harvest is ready and, yes, the corn crop was made during the winter and spring, at least a part of it, anyway.

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## *Erosion of Rural Society*

By JACK SCHAFFER, '43

There has been a great tumult and shouting about the erosion of soil. Many publications have sent forth suggestions to improve the fertility of our depleted soils. While trying to save our soils, many have forgotten that there is another type of erosion taking place, the erosion of the society that live on that soil. Here are some eye opening facts that was gathered by the President's Committee on Farm Tenancy. We quote some of this report:

"In the spring of 1935 there were more than a third (34.2 percent) of the 2,865,00 tenant farmers of the Nation who occupied their present farms only 1 year. In many areas the proportion exceed 50 percent. It lays a heavy hand upon the large numbers of rural children caught in this current, who find the schooling periodically interrupted, if not made impossible, and who suffer from mental as well as economically insecurity."

The basis for any successful agricultural foundation is education. The children of these people are the most uneducated in the nation. Without an education these people are an easy prey for a dictator making wild promises. They are easily fooled in trading or any business transaction. Such a condition must be remedied immediately.

The living conditions of these people have been presented on enough occasions to go without discussion here. The inadequate housing of a great portion of our population is causing an erosion of our society just as surely as onecrop farming is eroding our soil. The sooner we obliterate this sore eye the better our cultural foridation will be.

These people are very susceptible to many diseases. Then lack of good clothing, and housing cause ill health among them. This causes a loss in many working hours and wealth.

These people, due to ignorance and unreliability are a problem to credit agencies and land lords. They ruin the land lord's land because of their desire to get as large a return as possible, and they borrow money from credit agencies and in too many cases can't pay it back.

Our agriculture is faced with the problem of obtaining a fair share of our national income to recompense the farmers for their products and at the same time maintain the fertility of soil.

## *The 1941 A.S.A.E. Seminar*

By J. M. GIBERT, '43

The A. S. A. E. Industry Seminar is a program sponsored each year by The American Society of Agricultural Engineers with the cooperation of several farm equipment companies. It is a program constructed to give students, faculty members, and other college officials a better knowledge of the farm equipment industry. The delegates make inspection tours of plants and hear addresses on organization, research, finance and other phases of the industry.

The companies participating in 1941 were: Alis Chalmers Power Company, John Deere Plow Works, Minneapolis-Moline Power Implement Company, International Harvester Company, Oliver Tractor Company, and Caterpillar Tractor Company.

The deans of agriculture and engineering of many agricultural schools, professors of agriculture or engineering and students from thirty three states, Canada, Brazil, and Mexico attended this year. Representatives from here were: Dr. H. P. Cooper, Dean of Agriculture and Director of The Experiment Station; Professor G. H. Dunkelberg, Associate Agricultural Engineer, and E. M. Johnson and J. M. Gilbert students.

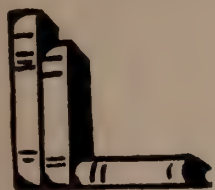
The Seminar showed that the farm equipment industry realizes that it is to its best interests to help the farmer improve his present state. This industry is also doing its share in the national defense program. By direct production of defense machines and machinery enabling fewer men to produce more food and fiber it is doing the lions share of a man sized job.

A glimpse of the inside of the farm machinery industry would cause any agriculturalist to become aware of the value of this industry to American agriculture. An opportunity for every student to see at least part of what was presented in this seminar would improve the curriculum of any agricultural school. —J. M. Gibert, 1943

Dr. W. T. Ferrier and Mr. H. A. White of the Department of Agricultural Economics are authors of a recent publication entitled, **Cotton Marketing in South Carolina.**

At the same time, there must be some action to regulate land tenure so there will be an adequate share of the agricultural income given to the people who actually till the soil.





# About This and That . . .

BY THE EDITORS



## THE COVER

THOMAS GREEN CLEMSON

*Born in Philadelphia July 1, 1807*

*Died at Fort Hill April, 6, 1888*

*Scientist—Diplomat—Soldier*

*Founder of Clemson College*

*and Benefactor to the Sons of  
his Adopted State.*

The cover of this issue shows the John Harvard of Clemson—Thomas Green Clemson. The words shown above are graven on the plaque affixed to the stone figure of this school's namesake. These few words could not possibly cover a career so colorful or a life lived so unselfishly nor could they possibly convey to the reader the workings of a brilliant mind.

Not only was he an educator, but a farmer, chemist, engineer, author and diplomat as well. His writings on scientific agriculture and agricultural chemistry were years ahead of his contemporaries and he was American Charge d'Affairs to Belgium for seven years.

The mock stone figure which appears on the cover of this issue of the AGRARIAN is a fitting tribute to a great man. The statue was erected by contributions made by a grateful student body through the efforts of Blue Key fraternity, and it is with a sincere feeling of respect and thankfulness that this issue of the AGRARIAN is dedicated to THOMAS GREEN CLEMSON.—S. K. A.

We ruin the lands that are already cleared and either cut down more wood, if we have it, or emigrate into the western country . . . A half, a third, or even a fourth of what land we mangle, well wrought and properly dressed, would produce more than the whole under our system of management; yet such is the force of habit, that we cannot depart from it.

George Washington, "In His Letters".

## OUR JUDGING TEAM

It has always been a mystery to me why a college of Agriculture can't pitch in and support a team that brings as much desirable publicity to Clemson as the Judging Team does. If it wasn't for the untiring efforts of a member of the Animal Husbandry Department faculty, and the willingness of six or eight cadets to devote almost all of their spare time to preparation we, an Agricultural College would still be in the dim, dark oblivion that all non-judging schools are relegated, when they are too lazy to get up a team.

Why can't we wake up to the fact that a team of this type brings attention to our school—the kind of attention of which we would be proud, is more than I can see. The AGRARIAN wishes the judging team to know that it stands behind them one hundred percent.

## I Accept

It is with considerable gratitude and humility that I take up the pen from Frank Rogers, last years very capable editor—gratitude for being given the opportunity to serve the School of Agriculture and Education and humility because of the magnitude of the task before me. I shall endeavor to the best of my ability to serve nobly and well our many readers throughout the state. I shall try to do justice to the phase of the life that the "Agrarian" represents. It gives me a great deal of pleasure to know that I have a very capable staff to rely upon.

The faculty members of the School of Agriculture and Education have been more than kind in their wholehearted cooperation and desire to use the "Agrarian" to good advantage.

Likewise, the students should feel free to use the "Agrarian" in every way consistent with the best interest of the publication. Since the "Agrarian" is the official publication of the Agriculture and Education school, it has a duty to perform and cooperative students make possible the completion of that duty to the fullest extend.

—E. P. H.



## Helpful Hints to Our Farmers

### LET'S NOT GIVE UP

In thousands of South Carolina cotton fields the yield is tragically disappointing and the disposition of many of our cotton farmers will be decidedly sour toward "white gold". Many after a light picking, will try to forget about wet weather and boll weevils and optimistically begin their plans for next years cotton crop. There will be next year, another cotton crop, and if the boll weevils are numerous, another state-wide failure.

It isn't an easy matter, in the presence of failure to prepare optimistically for the next effort. This is what South Carolina farmers must do. Begin the 1942 "Blitzkreig" against the boll weevil.

"Stalk destruction stops the breeding of weevils in immature squares and also deprives adult weevils of food", declares a circular from the extension service. "Early destruction is an effective way to reduce the number of weevils going into hibernation and the number surviving to return to the fields next spring."

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### COOPERATIVES

continued from page 10

A co-op must have efficient management to be successful. Unless you have men that know their business, a co-op is usually doomed to failure. There must be a sufficient volume of business for it to have any success. The financing must be sound, and the members should be loyal. It must serve an economic need, and its records and accounts should be kept in a state that anyone can understand them. They must make every effort to have a product of the highest quality, and they should try to have a good business reputation. Every effort to handle as few commodities as economically feasible should be made by co-ops. Draw up in writing all agreements; this will save argument later. A co-op must pay its members the prevailing prices if they expect to hold their business long. The members should have a get together every once in a while so that a friendly atmosphere will prevail.

There has been much discussion whether or not the government should aid cooperatives. The only logical conclusion is that if they are willing to aid private business in the interest of a few,

### GROW MORE VEGETABLES

Vegetable growers of South Carolina are asked to grow more vegetables, and to increase their 1941 acreages to meet the farm defense goals which have been set as a part of the total defense program for the UNITED STATES, says A. E. Schilletter, extension horticulturist.

In discussing the vegetable goals, Mr. Schilletter pointed out that everyone in the UNITED STATES must be well fed if the nation is to make the most effective effort toward national defense. One of the health benefits of improved diets, he said, would be more stamina to stand up under the stresses of the times and particularly during the period of top-speed production of defense materials.

Vegetables—particularly leafy green and yellow vegetables, are the most important sources of energy and sound health, according to the horticulturist. An adequate diet for the people of the United States, he indicated, would require the production and consumption of more than twice the vitamin-rich vegetables produced annually between 1936 and 1940.

With more purchasing power available and the increased knowledge of the foods that constitute a healthful diet, it is expected that public consumption of vegetables will rise suddenly.

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### FOOD FOR FITNESS

Following the successful operation of its Better Farm Living train in September the Clemson College Extension Service had at the State Fair an exhibit consisting of much the same material and emphasizing better living on the farm, especially through the production conservation, and consumption of foods essential to make farm people healthier and more efficient for home and national defense.

The exhibit, which was in charge of extension specialist of Clemson and Winthrop Colleges, was a compact display of ideas, practices, and suggestions on better farming for better living. Food to feed the family, methods of producing, processing, and preparing it, with stress on adequate diets, was given major attention in the exhibit and demonstrations.

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the government should help cooperatives that have the interest of many.

## Danforth Fellowship Trip

By W. M. HOBSON, '42

Every year, the Danforth Summer Fellowship is awarded to a rising agricultural senior in 38 different agricultural colleges of North America. This fellowship includes a two weeks study in St. Louis at the Ralston Purina Plant and experimental farm and two weeks training at the American Youth Foundation Leadership Training Camp at Shelby, Michigan. The winner of the fellowship at each of the schools is selected on his scholastic record and his leadership in college activities. The fellowship is indeed something worth working for during one's first three years in college, and it is a challenge to all men in the school of agriculture to try and win.

This fellowship is made possible through the efforts of William H. Danforth, chairman of the board of directors of the Ralston Purina Company.

I, as the representative from Clemson, experienced one of the greatest four weeks of my life this past summer on the 1941 fellowship.

Imagine really seeing and, to some extent, understanding the "inside" of a big business, and in discussing it, getting opinions from thirty seven states and Canada. Well, that was our privilege during our study at the Purina Plant.

The first three days were spent on the Purina Experimental Farm about forty miles out of St. Louis. On the farm there are about 1500 head of livestock and 15,000 head of poultry. While at the farm, we donned work clothes and went out among these animals and learned how they are all used in various feeding experiments. Careful and detailed records are kept on all the animals, and accurate results are obtained. None of the results obtained are held secretive, but may be, and frequently are used by state experiment stations. Several unusual and interesting things we saw at the farm were a dog carried to the South Pole by Admiral Byrd, several chin-chillas worth about \$3,000 per breeding pair, fur bearing rabbits, mink, fox and martins. By the end of the three days, all the boys, called the "Danforth Fellows," were well acquainted with one another, and many great friendships were being made. While at the farm, the boys played

soft ball games; one between the boys themselves, the east playing the west, and the other between the farm employees and the boys. The games were, in one respect, similar to an all-star game, because ten different states were represented on each of the boy's teams.

On returning to St. Louis, we took our first plunge into "big business." The "inside" was opened to us from every angle. Lectures were heard from the heads of the executive, research, marketing, advertising, financial, personal and legal departments. As in school, each lecture should have its practical period. So after each lecture, we visited the department just spoken about and saw its actual operations. For example, after the lecture from the personal director, we each were given a twenty minute interview with the director, to give us practice in applying for a job. We learned from the research department how a new product is perfected. From the advertising and marketing departmental heads we saw how this new product is introduced on the market, and the legal departmental head told of his many incidents of protecting in court the products or its name or package design.

The Purina Mill at St. Louis is one of their largest. We spent one morning on an inspectional tour of this plant, seeing the process of feed manufacturing beginning with the sampling of grain still in cars, and going all the way through to where the bagged feed is again returned to a car for shipment.

We did not spend all of our time in the Purina Plant and Offices, however. One unforgettable day we were the guests of Swift and Company at the East St. Louis Stock Yards. During the morning, we had the opportunity to go with the livestock buyers as they went about the stock yards purchasing cattle, hogs and sheep. Each buyer would explain how he estimated his offer, and why he did or didn't buy a certain lot of cattle. During the afternoon, we made an extensive tour of the Swift Packing Plant. Another morning, we visited the St. Louis Grain Exchange. There we had the opportunity to ask endless questions about the marketing of grain on the market. We spent the remainder of this



day as guests of the Chamber of Commerce. As their guests, we visited such historic and interesting spots in St. Louis as the oldest court house west of the Mississippi River, the Shaw Botanical Gardens, the Jefferson Memorial, the St. Louis Zoo, and radio station KMOX.

Quite often Mr. Earle Sindecuse, the gentleman in charge of the Danforth Fellows, arranged entertainment for us which we knew nothing of and which always came as a pleasant surprise. Two such occasions were an airplane tour over St. Louis one night, and a trip to the internationally known St. Louis open air Municipal Opera to hear "The Merry Widow."

Reluctantly the boys bade farewell to St. Louis and yet looked eagerly forward to the coming two weeks at Camp Miniwanca.

On the trip from St. Louis to the camp, the first night was spent in Chicago. There the boys were free to do what they wanted to. Most of them visited the Aquarium, the Planetarium, Soldiers Field and the Field Museum.

The second night was spent at the Battle Creek Sanatorium. No, we were O.K.; but we did discover a wonderful place to go should we ever have the need of a bit of quiet relaxation under a doctor's care. Before leaving Battle Creek, we toured the Ralston Purina Cereal Plant located there, and saw the manufacturing and packaging of their breakfast cereals.

At Camp Miniwanca there were some 350 campers and leaders, each outstanding in one or usually several respects. Practically every state in the Union was represented as well as Canada and England.

At the camp, not a moment in the day which began at 6:30 with a cold dip into Lake Michigan and ended with Taps at 10:00, was "labeled idle." Every activity was carefully planned and ran according to schedule. The theme of the camp was four-fold leadership development. Classes in leadership training and successful living began at 8:30 and ended at 3:00 with a break for dinner at 12:30.

Mr. Danforth's motto, "My own self at my very best all the time," was quickly adopted by all the members of the group.

Each afternoon was spent in playing soft ball, soccer, and volley ball followed by swimming or boating on Stony Lake and Lake Michigan.

Following supper, as sunset was approaching, the entire camp silently climbed to the top of Vesper Dune, a large sand dune overlooking Lake Michigan. There a short vesper program was presented. Sail boats and steam ships could be vaguely seen on the horizon as the sun settled into Lake Michigan and the red glows of a beautiful sunset faded from our sight. This was indeed a perfect place for spiritual meditation.

This brief surmise of camp life has illustrated three phases of the four-fold development, namely mental, physical, and religious. The social or fourth phase came each night after vespers. There were beach parties, council meetings, camp singings, and a barn dance where half the boys were dressed as girls.

After each of these action packed days, everyone was ready for bed when Taps was blown at 10:00.

All good things must end sometime. Too soon did our month of fellowship come to an end. All the boys agreed that, in many respects, our trip and the things learned and experienced on it were worth a year in school. We each had been "dared" by Mr. Danforth to live tall, think tall, stand tall, and smile tall. As we departed, we all had the determination to do our very best all the time to live up to this challenge.

Each summer a freshman in these same Agricultural Colleges is awarded a half fellowship to attend the camp. I myself, dare all men in the School of Agriculture to win these fellowships.



Walter Hobson with Mr. Danforth



# Who Should Be Dairymen?

By CHARLES JAMES III, '43

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*To be a successful dairyman one must be willing to work early and late. It isn't a job for a man who isn't a steady willing worker.*

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Courtesy of S. C. EXPERIMENT STATION.

To be a successful dairyman, cows like this are necessary

Many "cotton and corn" farmers in South Carolina are now realizing that they must change to a different form of agriculture in order to receive the maximum profits from their land. Some favor poultry keeping, others the raising of beef steers and hogs, while a great many agriculturists consider dairy farming the most suitable occupation for their own surrounding conditions. This article is intended for those interested in becoming dairymen.

Any person contemplating going into dairying should by all means study the factors which will influence his future favorably or unfavorably.

First of all, is there a satisfactory market for dairy products? Milk can be sold wholesale or retail, to ice cream plants, creameries, condensers, cooperatives, and cheese factories. If one wishes to sell wholesale, he will receive higher prices. However, an added amount of capi-



Courtesy of S. C. EXPERIMENT STATION.

Good pasturage is of vital importance

tal must be available for the necessary labor and equipment required for pasteurizing, cooling, bottling, and delivering the milk.

With the modern systems of refrigeration and transportation, it's possible to ship dairy products long distances without any noticeable depreciation in quality. In many instances, good transportation is unavailable, and the market is not conveniently located; therefore, it would be unwise to decide on dairying if this particular condition exists.

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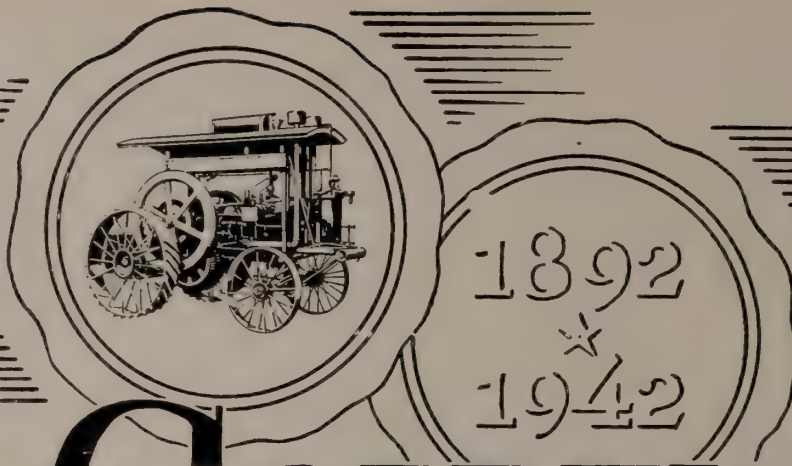
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## DAIRYING EQUIPMENT AND METHODS

continued from page 9

Good dairy plant equipment operated by capable men who are using good common sense methods of sanitation can and does produce a product highly desired by the public. Neither the equipment nor the methods can accomplish the task alone. It is the purpose of the modern dairy products plant to combine these two indispensable phases in the output of a product which will give merit to the progress of the dairy industry.





# *The* GOLDEN Year in Farmpower



A Welsh-born boy entered the Case factory as a machinist apprentice at the age of 16. Six years afterward, in 1892, he helped build a Case tractor—the first gas-engined tractor of record to go out and do actual farm work. Later he went abroad, studied what the Old World had created in large-size internal-combustion engines, returned and designed blast-furnace waste-gas engines used to this day in steel mills. Returning to Case in 1910 he rose steadily to the rank of Vice-President in charge of tractor engineering. Now, on the eve of the company's centennial and the golden anniversary of its first farm tractor, David Pryce Davies is Consulting Engineer for all Case factories.



## *The American Way is to Keep Frontiers Open*



Golden Anniversary  
Model "SC"

### Centennial Jubilee in 1942

In 1842 another youth, Jerome I. Case, began to furnish American agriculture with grain-saving machines. In 1942 the company he founded will celebrate its centennial with national ceremonies, historical pageantry, and educational exhibits. You are invited to witness these special events of the Case Centennial year. Look for local and regional announcements.

Your chances for rising high in America are greater than D. P. Davies ever had. You enjoy the benefits of native birth and of more formal education than ever was his. You live in an age when science and engineering, agriculture and industry all leap forward. Before your eyes new frontiers unfold far faster than they did for the youth of fifty years ago.

Yet to find your full place in this rich future you need two things that Mr. Davies had. One is the individual will to work with whatever talent and training you have. The other is the full freedom of the American way... the warm welcome that free enterprise gives to a better man, a better method,

a better machine... the system that stimulates men to create ever richer blessings for their fellows, and rewards them according to their creations. By this principle of unlimited opportunity, a single century sufficed to transform a wilderness into the greatest nation on earth, to attain the highest living standards in all the history of mankind.

Today, youth's fight is for freedom of the frontiers. Today, as a century ago, Case is on the side of youth. In farmpower the Case challenge to your choice is based not on having built the first tractor, but on building the latest tractors; not on seniority, but on superiority. J. I. Case Co., Racine, Wis.

# CASE

# The Condition of Our Forests

By T. V. WILSON, '42

---

*In the midst of a spending spree, let's not waste our most valuable resources—our Forests . . . .*

---

When the pioneers and early settlers started moving west on the so called "Gold Rush" they found the land across which they traveled densely settled with forests. But since that time lumbermen and farmers have gone in and literally destroyed many forest by tramping and breaking many small trees just to get the larger ones cut. That was the type of person who could not see any further than the end of his nose. He had plenty so why take care to not destroy the smaller trees? His attitude was "let the future generations lookout for themselves, I have all that I want." Due to the attitude, and too, due to ignorance in some cases, much of the South's best forest were destroyed. This type of destruction not only reduces the source of lumber and many other wood products, but it also leaves the land in the worst condition it could possibly be left in. This is especially true in the hilly sections of the South where tons of good productive soil is washed away yearly. Another cause of reduction in forest area is due to fires. In the past forest fires were much more numerous than at the present time. There was plenty of timber land so the people naturally weren't as careful as they would have been if less wooded areas were present.

Well then you may ask, is any measure being taken to correct this great mistake? Yes, work was really started on a plan about the end of the first world war, and as time passed more and more work was devoted to forestry programs. Since 1919 the total amount of forest land in the South has declined only about 2 percent. Better than that, certain counties in South Carolina have increased in wooded area as much as 25 percent. However, taking the whole state, the change is very little. The total forest land in South Carolina in 1919 was 12,392,700 acres; In 1934 the acreage was 12,877,715. This shows a slight increase as compared to a decrease in all other southern states except Georgia which also showed very little increase. To the above figures

should be added 437,088 acres of so called crop land which needs restocking. Most of it is too poor or infertile to grow anything but trees.

Even with the present acreage of forest as low as it is, the most important problem is not to reforest so much land but to exercise maximum care in proper management and maintenance of our present forest.

Perhaps the most evident loss annually is due to fires, however, this figure in South Carolina is much lower than that of neighboring states. It is three percent while some states reach as high as twenty-five and thirty-three percent. The United States forestry service has done much to control fires by placing fire towers and ranger bases in different sections of the state. Also the civilian conservation corps has rendered excellent service in controlling fires.

Although fires are more vivid, the greatest destruction to forests is the problem of poor management or the lack of management. Most of the owner of forest do not know how to get the best cut of their wooded areas over a period of time. It is true that they do not know which trees to cut for best results, nor do they know how thin the trees should be left. That is where the forests service enters—trying to educate the farmers so better management will result and timber production will be substantially increased in the future.

★

THE ANIMAL HUSBANDRY  
DEPARTMENT  
of  
CLEMSON COLLEGE

★

Purebred

Berkshire Swine

Polled Hereford Cattle

Hampshire and Southdown Sheep

★



## WHO SHOULD BECOME DAIRYMEN

continued from page 25

A profitable dairy farm must be situated in a section where the climatic conditions are suitable for raising a healthy, productive herd. It should be large and fertile enough for the growing of sufficient pastures and feed crops. The size and fertility of the farm will largely determine the number of cattle that can be maintained.

Dairying is one farm enterprise which requires more capital than other forms of agriculture. Buildings, equipment, and the herd represent the three major expense items. Unwise expenditure will result in failure for the operator.

Most dairymen find it necessary to have a dairy barn, milk house, silo and a place for the storage of hay, grain, and bedding. A place should also be provided for sheltering the bull and young stock. In many instances the buildings occupying the farm can be remodeled for the dairy.

The man contemplating dairying has to use a great part of his funds in buying a foundation herd. Only those cows which are healthy and are good producers should be purchased. The bull is a most important part of the herd and should be selected with the utmost of care. It's much wiser to start with a small herd which is known to have many favorable qualities than to start with a large herd which is "scrubby."

Equipment for the dairy should be selected on the basis of durability, providing comfort and health for the animals, convenience of performing work, and producing clean milk. It's not necessary to secure all the elaborate equipment to start a dairy. For example, a farmer can milk a small herd by hand, although a milking machine will prove very beneficial when he has the proper funds to secure one.

After the prospective dairymen has thoroughly investigated his capital and land resources, he should be sure he likes the dairy cow enough to work for her every day in the year. Of course, some dairymen find they can obtain competent substitutes for vacation time and holidays.

In conclusion, it can be said that dairying is a farm industry that protects the land from excessive erosion, keeps the land fertile, furnishes year around labor, and returns regular cash receipts. Intelligent planning and management of the dairy will result in success for the operator.

## SOIL DEPLETION

continued from page 8

soil increasing its permeability and allowing the water to soak in more rapidly, with a resultant decrease in run-off and erosion. The turning under of the cover crop as green manure results in increased yields of succeeding crops; however, it is often necessary to add nitrogen to the soil to facilitate decay if the cover crop is a non-legume.

Many crop rotations have been planned for southern agriculture, but their general adoption has been slow. Southern farmers know that the addition of large quantities of vegetable matter to the soil is a major factor in rebuilding and maintaining its fertility, and until they develop cropping systems to this end, soil depletion will not be checked.

## GUEST EDITORIAL

continued from page 7

the farmers interest at heart. They must work together and towards the same end.

The State Department of Agriculture has a very definite part in this picture and it is our desire to work cooperatively with everybody and every group, looking towards a better agriculture for South Carolina. Let us all get together for the public good and for our own benefit and to all we say we want to work with you and want you to work with us because we are of "one nation—indivisible, with liberty and justice to all."

Dr. G. H. Aull, Dr. W. T. Hicks and Mr. O. M. Clark represented Clemson College at a regional agricultural planning conference in Asheville, North Carolina on June 16-19, 1941. The conference was attended by representatives from eight southern states and was for the purpose of summarizing recommendations of state agricultural committees and of formulating additional recommendations designed to influence national policy with respect to agriculture.

FOR CHRISTMAS GIFTS SEE—

**HOKE SLOAN**

MEN'S WEAR

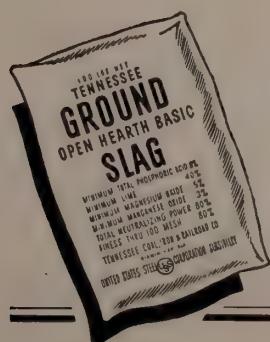
R. O. T. C. Men Use Your Credit

A black and white photograph of a large herd of cattle grazing in a field. The cattle are scattered across the middle ground, with some standing and others grazing. The background features a line of trees under a bright sky.

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*Says H. C. Hahn, Highland Farm, Aiken, S. C.*

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## SCIENCE IN AGRICULTURE

continued from page 4

against nature, for nature would prefer our soils to be covered with timber.

Williams: You know, Dr. Collings, I had never thought of that but since you mention it I recollect many good pasture areas in my community that have been ruined by pines and other young tree growth and such.

Collings: Not only are our soils timber soils, but many of them are so poor they are unable to produce good grass. It's not generally known, but probably because our soils are timber soils we do not have a single native pasture that is worth a continental. All of our good pasture grasses have been imported, and imported plants nearly always require the best land for their successful production. For this reason, Mr. Williams, the best pastures are always secured on the best land. Many farmers fail to produce successful pastures because they select the poorest land on their places for pasture land.

Williams: You are certainly right there, Dr. Collings. My neighbors take their best land for cotton and the poorest land for pasture. They have just what you called it a while ago, an exercise lot but not a pasture.

Collings: Not only will the best pastures be produced on the best land, Mr. Williams, but even the best South Carolina pasture land needs to be fertilized. Most South Carolina soils are generally very deficient in phosphorus and calcium, and sometime nitrogen and potash also are required. Two to four hundred pounds of superphosphate per acre applied every three or four years should, in most cases, take care of the phosphorus needs of pasture grass. This seems to be an essential in good pasture management for all parts of the state. In fact, this treatment alone would probably rejuvenate many South Carolina pastures.

Williams: But, Dr. Collings, I have heard our county agent stress the need for liming. He says that more than half the land in South Carolina is too acid to grow profitable crops.

Collings: He's right, Mr. Williams; I was just coming to that. The application of superphosphate must go hand in hand with the application of lime. The soils of South Carolina are notoriously acid. The yields of nearly all crops grown in the state are not as good as they should be because of soil acidity, and pasture crops are no exception. Any program of pasture improvement in South Carolina must give first considera-

tion to liming. An initial application of a ton of lime to the acre, followed by other similar applications every three or four years, should be made with the object of bringing the reaction of the soil up to pH 6.5 and maintaining it at about that point. There is no question but that the application of lime and phosphate is the key to successful pasture fertilization in South Carolina. As a result of this method of treatment, there are a number of pastures in South Carolina that now have a greater livestock carrying capacity than many pastures in the Blue Grass region of Kentucky.

Williams: Dr. Collings, you haven't said anything about pasture grasses. Will blue grass do well in this state or had we better stock to Bermuda grass?

Collings: Stick to the Bermuda grass, Mr. Williams. It's the foundation plant for good South Carolina pastures. Blue grass, red-top, orchard grass, and other grasses which are adapted primarily to areas north of here, will not hold up in this state. Carpet grass may also do exceedingly well, especially on the soils of the Coastal Plain. However, carpet grass will not make the yield of nutritious pasturage that can be expected from Bermuda grass. It is well to have some Dallas grass mixed with Bermuda but even if this grass is not planted it will establish itself in most Bermuda sods if the acidity of the soil is kept low. The liming of a pasture nearly always results in an increase in Dallas grass.

Williams: Well, what about legumes in the pasture?

Collings: Mr. Williams, pastures should contain legumes if they are to produce the most nutritious feed. For this reason every effort should be made to secure a good stand of legumes. Pastures should never be burned for there is no more efficient method of getting rid of legumes than by burning. And then, in addition, fire will reduce the yield of the grasses that do survive, so fire should be avoided like the plague.

Williams: Dr. Collings, what legumes are the most satisfactory for South Carolina pastures?

Collings: It is difficult to keep legumes in South Carolina pastures unless the acidity is naturally low, as it is in the Iredell family of soils, or unless the acidity has been reduced by liming. When the acidity is kept low, about pH 6.0, and when phosphates have been added, no difficulty should be experienced in maintaining a stand of Dutch clover and lespedeza, and in



most cases, hop clover should be abundant in the spring. This is especially true where applications of barnyard manure have been made from time to time.

Williams: Then, Dr. Collings, from what you say can I conclude that most South Carolina soils can be made to produce good pastures if given proper fertilization and proper pasture management and that some South Carolina soils are ideally suited for this purpose?

Collings: Yes, Mr. Williams, good pastures can be produced and what is more, are being produced in South Carolina. As a result, more livestock can and will be grown in South Carolina. As a result, more livestock can and will be grown in South Carolina and a better balanced system of farming obtained for the farmers of the state.

Mr. Williams: You mentioned that the Iredell family of soils were not very acid. Where are these soils found and are they good pasture soils?

Collings: They are among the best pasture soils we have, Mr. Williams, and when well drained are also excellent for other crops especially the legumes. The Iredell family of soils is found scattered all over the Piedmont but particularly through the central Piedmont. These soils might be called livestock soils because they are capable of producing such excellent hays and pasturage. Eventually a profitable livestock system of farming will, no doubt, develop on the soils of the Iredell family. Much of this land can now be bought at prices below its actual value because its value is not generally realized.

WHERE OLD FRIENDS

MEET

BOWL 'EM DOWN

At

INGRAM'S BOWLING CENTER

Clemson,

S. C.

## IS FARM YOUTH DETERIORATING?

continued from page 3

land and the principles upon which it is built. No great show of flag-waving is made, but when they say, "I pledge allegiance to the flag of the United States of America and to the Republic for which it stands, one nation, indivisible, with liberty and justice for all", you may rest assured that each word comes from the heart, sincerely and without reservation.

And as for how these boys stack up against their elders, let me cite the case of one boy who applied for and received his American Farmer degree at this convention. He has competed against adult, professional swine breeders and has come out ahead of them more often than they ahead of him. As well as the author remembers, the record for which he was trying has been reached sixteen times, four of these times by this mere slip of a boy. That speaks well for farm youth.

There are countless other cases, too numerous to mention here, in which the American youth of today has proven his true mettle. It is hard to believe some of the records these boys have made but they are indisputable.

The farm boy of this country seems to have ignored or overcome the bad in the nation and is striving to make better the good he has found. For this reason, when some wiseacre says to me, "The youngsters of today are softies. They ain't the man we were at that age", I raise an eyebrow, give them a condenscending smile, and reply, "Look at the record, brother, look at the record."



Help America in its fight against

mechanized barbarism . . .

BUY DEFENSE BONDS

TODAY





# Let Us Be Thankful

By E. P. Huguenin, '42

We honor the holidays with many worthwhile ideas. We underline the occasion in red on the Calendar, plan it down to the last cranberry, and then settle back on our haunches in anticipation of the feed to be had. Minute issues may divide us, during the year—we seldom see eye to eye on politics, which color Mary's dress was, or what to have for Friday's supper. But with Thanksgiving, we rise above our small and petty differences, to find that we all have a common share in that old favorite, Thanksgiving Gratitude.

It is interesting to read what Edward Winslow, three times governor of Plymouth Colony, wrote to a friend in 1621. "We set the last Spring some twenty acres of Indian corn and sowed some sixty acres of barley and peas; and according to the manner of the Indians, we manured our

grounds with herrings or rather shads, which we have in great abundance and take with great ease at our doors . . . . Our barley did thrive well; and, God be praised, we had a good increase of Indian corn . . . . Our harvest being gotten in. Our Governor sent four men on fowling, that so we might, after a special manner, rejoice together after we had gathered in the fruits of our labor." Those colonist planned, worked and reaped a harvest which meant the difference between life and death. Their's was a victory over starvation.

Beset on either side of our oceans by strife and hate, let us look to our blessings and be grateful. We have spent a year of living, we have a personal harvest to reap. Let us look to the future and plan the next harvest with the earnestness with which those pilgrims planned our "First Thanksgiving."

## KUDZU PLANTS

In less than a decade kudzu, introduced from Japan some fifty years ago and commonly called a porch vine, has been transformed into an important field crop in the Southeast. Since the beginning of erosion control projects, more than 40,000 acres of eroded land have been planted to this one ornamental plant.

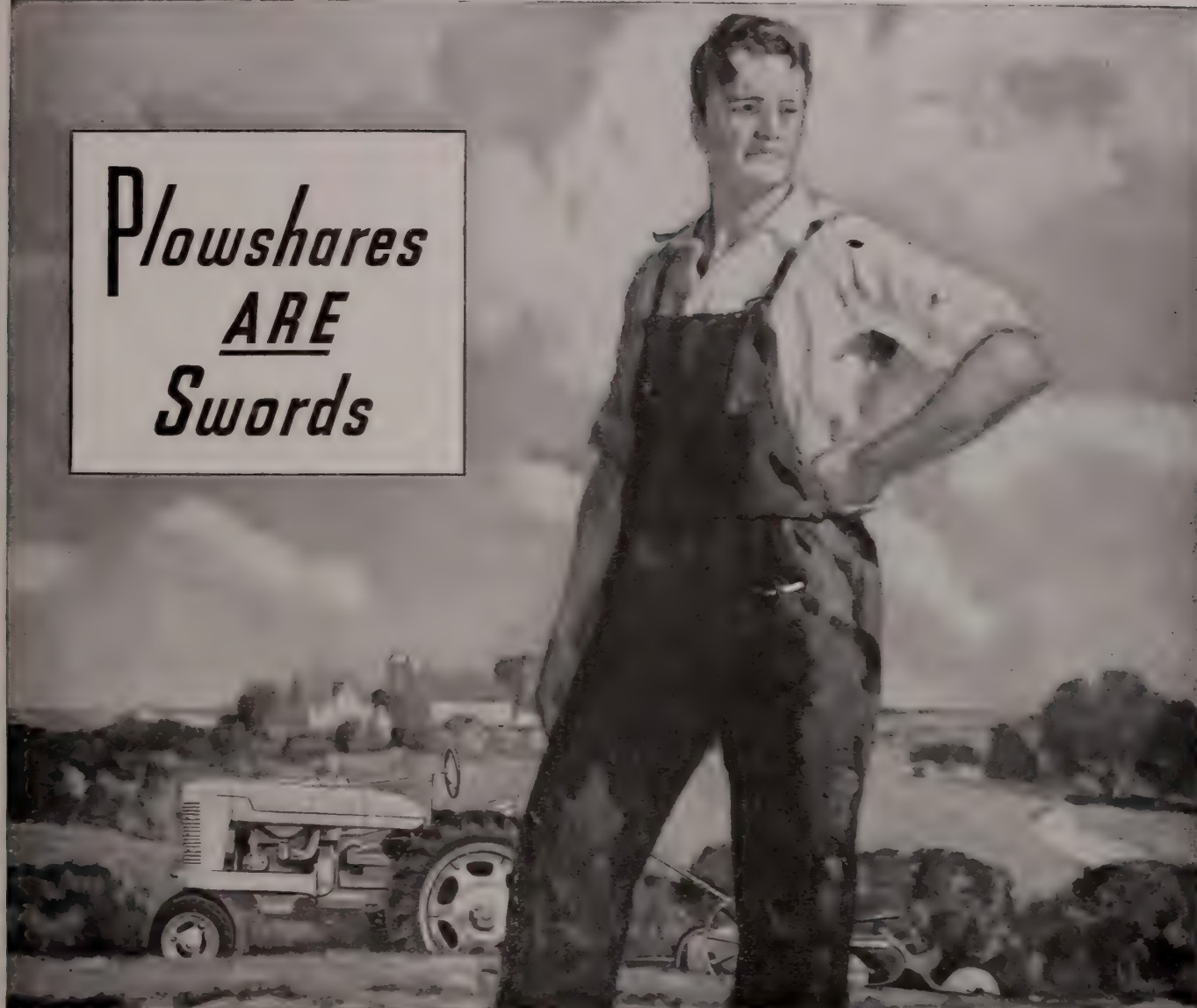
Kudzu is adapted especially to Southeastern

soil and climatic conditions and is not affected seriously by droughts. It will not grow well, however, on poorly drained areas of acid soils or on low marshy lands. The plant is a deciduous, viney legume which grows rapidly during spring and summer, Kudzu restores fertility to the soil by adding organic matter and nitrogen, and it maintains a stand over very long periods without yearly replantings.



Kudzu in the foreground . . . a barren waste in the background.

**Plowshares  
ARE  
Swords**



MODERN WAR is a battle for materials. To check the life-giving flow of materials, British warships ring the European continent while German bombers and submarines encircle Britain.

Beyond comparison, the most vital of materials is food. Unlike steel or copper, aluminum or rubber, food has no substitutes. We have it or we do not have it. With it, all things are possible. Without it, tanks and planes can give no security. If the defense of America is to be certain, food for 130,000,000 Americans, and those who stand with us, must come regularly to market.

Today, as always, the production of that food is the task of American farmers. Today, more than ever, American farmers are relying on the farm equipment industry to provide them with the mechanized tools of agriculture. For, while the need for farm products rises, the supply of farm labor constantly dwindles as men

are diverted to the Armed Services and the factories.

This Company and the industry of which it is a part have the factories, the trained employees, the engineering skill, and the distributing organizations to get these vital tools to the farmers of America where they need them and when they need them—*subject only to the allocation of materials.*

Swords are beaten into plowshares when peace follows war. Today, throughout the world, plowshares are beaten into swords... In America, the greatest food-producing country in the world, it is well to consider that **Plowshares ARE Swords!**

*Fowler McCormick*  
President

INTERNATIONAL HARVESTER COMPANY, CHICAGO, ILL.

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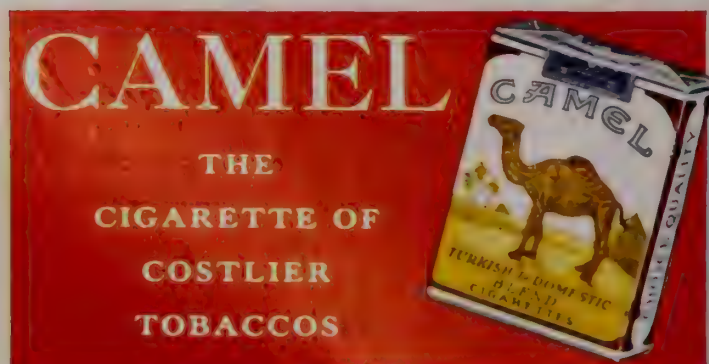


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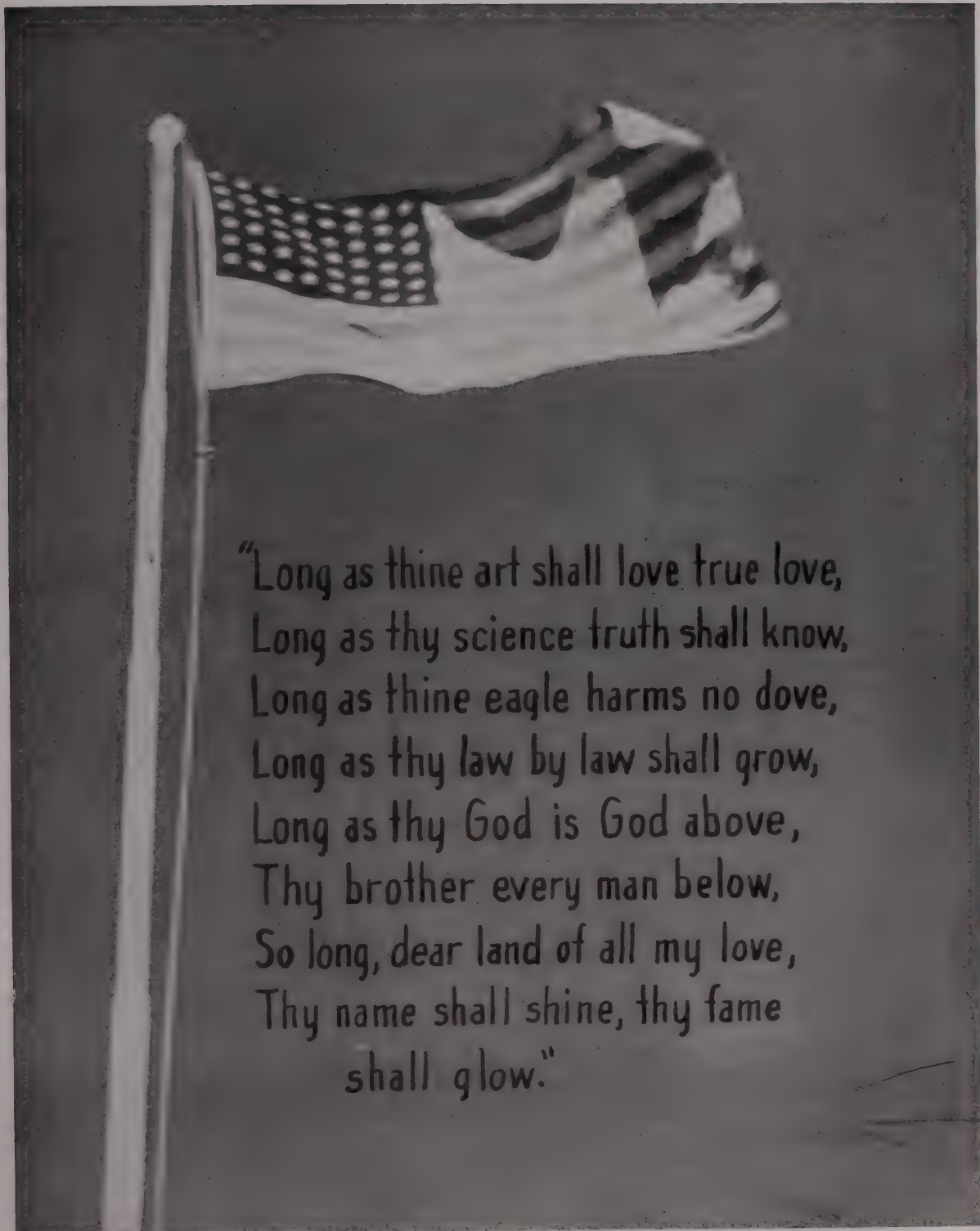
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OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



"Long as thine art shall love true love,  
Long as thy science truth shall know,  
Long as thine eagle harms no dove,  
Long as thy law by law shall grow,  
Long as thy God is God above,  
Thy brother every man below,  
So long, dear land of all my love,  
Thy name shall shine, thy fame  
shall glow."



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*Says* 'Mr. EXTRA TRACTION



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# *The* Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 4



No. 2

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# *Research Leads The Way Toward Diversified Agriculture In South Carolina*

GUEST EDITORIAL---By R. A. McGinty

For a long time diversification was a favorite topic of southern agricultural workers who emphasized its value at meetings of farmers and in bulletins and other publications. But, in spite of the constant preaching which seemed to appeal to the sinners, there were few real converts. The farmers of South Carolina and the southeast continued to put nearly all their eggs in the cotton basket.

The basic reason for this failure to diversify has come to be appreciated only within the past few years. Farmers were simply unable to produce at a profit the livestock and many of the crops recommended. Why? Mostly because the soil was too acid. Soil acidity and its disadvantages have been recognized for many years, but here in the southeast little was done about it. Cotton and tobacco could endure some acidity and still produce fair crops. As long as unlimited acreages of these crops could be planted, the farmers didn't worry a great deal. However, when the AAA program made the production of substitutes for cotton absolutely essential, measures began to be taken to correct soil acidity and other conditions which had precluded profitable diversification. Fortunately, the South Carolina Experiment Station was able to furnish the fundamental information required to make the necessary adjustments. The research carried on during the 50 years since the station was established has been worth millions of dollars to the farmers of the state. But the investigations of the past 10 years have a particular bearing upon these recent adjustments in our system of farming.

In 1930, Dr. H. P. Cooper, Director of the Station, came to Clemson as head of the Agronomy Department and recognized at once that soil acidity was a serious problem in the state. With the help of one of the governmental agencies he organized a project under which two million soil samples were collected from the farms of the state and were tested for acidity. The results of this work showed that only 20

percent of the soils of South Carolina were suitable for the maintenance of a diversified system of farming. Another 40 percent of the soils were found to have a pH range suitable for cotton and tobacco but not for the production of nutritious legumes and other crops essential in a diversified system involving livestock. The remaining 40 percent proved to be too acid to grow even cotton economically.

The obvious remedy for this situation was, of course, lime—and lots of it. Although objections were voiced to the use of lime on the grounds that it would “ruin the land” or cause other troubles more serious than acidity, these prejudices gradually have been overcome by presenting all the facts developed through research, and lime is now being used by large numbers of farmers.

With a suitable soil reaction secured through liming, the state can proceed with the production of diversified crops and livestock if proper fertilization and good management are practiced.

South Carolina is a heavy user of chemical fertilizers, and it is important that the right kind of fertilizer materials be applied. Here again the experiment station has led the way toward more economical practices. The new fertilizer law sponsored by the station requires that all fertilizers contain not less than 16 units of plant food. This requirement has eliminated useless filler which is estimated to have cost the farmers of the state a million dollars a year.

“Minor element” deficiencies have caused increasing injury to crops as fertilizer materials have become more and more highly refined. Through the efforts of the experiment station large numbers of South Carolina farmers have learned to identify the deficiency symptoms and the remedies to use. Our farmers are reputed to have better knowledge of these deficiencies, and in fact of most soils problems than those in any other section of the country.

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# EDITORIALS

In natural beauty the Clemson campus ranks third among our nation's college campuses. The University of Wisconsin leads, and Cornell University ranks second. Without Mother Nature's priceless endowments, none of these college campuses could boast their beauty. Still, without the care and ceaseless labor of many generations who loved these colleges, nature's contributions would have been in vain.

It seems to be man's unconquerable habit to take for granted those things which have been handed down to him with little or none of his own effort. Strange to say, many of us at Clemson fail in actions at times to show appreciation for the beautiful campus which has been passed down to us. This thoughtlessness is most noticeable in the spring when the grass buds are trying to get a start in the world. These small plants have no chance whatsoever to survive at certain small areas of the campus, because they are being continuously trampled by students. The geometric axiom, a straight line is the shortest distance between two points, is put into action; and thousands of feet heedlessly mar areas which are indispensable to the beauty of our campus. The sign, "Let no one say to your shame that all was beauty here before you came," is unheeded, if not unread, by many of us as we march on toward the destruction of that which the sign is unsuccessfully trying to protect.

While it is true that the Clemson campus might continue to rank third in natural beauty among American colleges in spite of our present destructive campaign, it is also true that we can unthoughtfully lower the rank of our beloved campus. We have men who replant barren areas of the lawn each spring, it is true; but what progress can these men make when we destroy the very fruits of their effort? This injury to Clemson's campus is not committed intentionally; it is a product of our failure to think about what we are doing. One person's walking across a plot of grass makes little difference; but when hundreds of boys are involved, the case is entirely different. If everyone walks on the grass at greatly used areas, most of it will die; if everyone uses the sidewalk, the grass will be green and beautiful. Let us stop taking the "short cuts" to classes. The difference is minimized to us who see the campus every day, but it is greatly magnified to those who rarely see Clemson.—E. B. C.

On December 7, 1941 the last flicker of the light of peace on this globe was ruthlessly doused by the little yellow pseudo-Napoleons of Asia. The blackout was complete. Every continent is affected, no major country remains uninvolved. No longer can the war be discussed in terms of "they", for it is now "we", who are fighting this battle for the privilege of living as human beings.

More than in any previous war this is a battle of every man, woman and child, regardless of whoever or whenever he is. The front line trenches are in your yard and in mine.

This war is a war of production. Sixty thousand airplanes, forty thousand tanks, eight million tons of shipping. Impossible tasks? Impossible tasks to any but a free people striving to preserve all they hold dear. Impossible unless every American rolls up his sleeves and digs into his job with the spirit that justified the Alamo, avenged the Main and extracted full price for Wake, Guam and Midway.

The responsibility for production falls no heavier on any than on the already burdened shoulders of the American farmer. It is he who must produce more food, more cotton, more fats, more of every essential product. He must feed and clothe the United Nations of the World as well as support their armies in the field. He must not merely maintain production but must increase production with less fertilizer and with old machinery. His most valuable tool will be the unconquerable American will to win. Each turn of the furrow will be digging a little deeper the graves of the bloodthirsty warlords who rule the dictatorships.

When soil and sinews have been coordinated, when final victory has been won and the all clear has been sounded, the flicker that was so suddenly snuffed out will once more burst into a glorious flame of peace—a peace which we shall win. A peace which will carry assurance against the repeating of Pearl Harbor. It will be a peace of the people, for it is the people who will be the victors. Until that victory is won we must keep our sleeves up and the sweat pouring, for that is the only way we can achieve our goal.—S. K. A.



# Quality Eggs Bring Higher Prices

By C. A. JAMES, III, '43



Courtesy S. C. EXTENSION SERVICE.

Uniform eggs packed in cartons command best market prices

Eggs must have interior and exterior quality in order to obtain the maximum price at both wholesale and retail markets. According to the United States Department of Agriculture, there are five primary factors and three secondary factors which the producer should carefully consider before he puts his eggs on the market. The primary factors are as follows: condition of the shell, air cell, yolk, egg albumin, and germ spot. The secondary factors are the color of the shell and the size and weight of the egg.

In order to discover the condition of the contents of an egg without breaking the shell, it must be candled. Candling is the process of holding an egg in front of a sufficiently strong light so as to make the contents observable.

When purchasing eggs, the buyers first impression is made by the appearance of the shell. Eggs sold as first class should have strong shells; shells that are free from cracks, checks, abnormalities of structure, and are clean.

High quality eggs must have small, immovable air cells. These air cells should not measure more than one eighth of an inch in depth. A condition where the air cell is larger usually indicates greater age, while a movable air cell is an indication of rough handling.

When candling eggs, a yolk which is barely visible and does not move to any extent is desired. As to the color of the yolk, there is a va-

riety of demand; however, the chief requirement is a uniformity of color within a given lot of eggs.

Egg albumin should always be free from blood clots and meat spots as such a condition will lower and often destroy the value of the eggs. Thin watery albumin is undesirable; therefore, it is imperative that the albumin be firm and clear.

Exposed to an environment of heat, fertile eggs will develop large germ spots which in turn will produce blood. Bloody eggs are inedible, and a number of such eggs will bring lower prices.

We now know the important requirements for high quality eggs; the question is how may we obtain this quality? First of all we must start with the source of the egg, the hen.

Heredity has been found to be an extremely important factor in determining egg quality. It is now known that the relative amount of thick and thin white in eggs is an inherited character.

Fowls will require the proper nutrients if they are to produce large numbers of eggs of high quality. The concentration of the yellow pigment in the yolk is primarily due to the plant pigment, xanthophyll, present in the ration. A thin shelled egg is usually due to a lack of calcium or vitamin D or both in the hen's diet.

Fertile eggs can be avoided by merely keeping all males separated from the females. The males presence in the flock does not have any favorable effect upon production.

After the quality egg is laid, the producer is solely responsible for the maintenance of this quality.

Care should be taken to provide a sufficient number of clean nests so as to prevent dirty eggs. Dirty eggs should not be put on the market as they discourage the consumer from buying. Often the farmer will wash dirty eggs. This practice should be discouraged because washed eggs when stored will not retain their freshness to the same extent as will an unwashed egg.

It is wise to gather eggs at least twice a day so as to avoid heating or freezing as the case may be. After the eggs are gathered, they should be cooled immediately and kept cool in a place of rather high humidity.

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# Young Proves Soundness of Using Purebred Cows

By E. P. HUGUENIN, '42

One of the best herds in the state . . . this herd holds as many state records as all the other herds combined.

It was twenty-four years ago that Fred H. Young, large-scale cotton grower of Florence County, launched into the dairy business when the boll weevil invaded and captured the domain of King Cotton. Many doubted the advisability of this as they did Mr. Young's purchase of his first purebred heifer for \$200.00. But it wasn't long before this cow, Belle de Sarah, called the "Gold Cow," came through with her first official test making a medal of merit yield of 858.10 pounds of butterfat, 16,373 pounds of milk. She made this remarkable record when eight years old in a 365 day test.

Progress from this point was rapid, for in 1925 Sensation's Mikado's Millie furnished Dixie's first butterfat and milk championship by producing 850.81 pounds of butterfat, 13,303 pounds of milk as a senior two year old in 365 days. This yield won a medal of merit and silver medal. Tested again as a 7 year old, "Millie" went a step further and captured another medal of merit with a record of 953.89 pounds of butterfat, 15,884 pounds of milk in 365 days, winning the butterfat championship for her age-class and testing division. These championships have never been superseded and "Millie's" 953.89 pound butterfat record is the highest of any champion producer in South Carolina.

The proof that "Fred Young and Son" can raise medal winners as well as start out with them is brought to light by more recent achievements. Two Jersey bulls in the Young herd have qualified for silver medal awards of The American Jersey Cattle Club, national organization of Jersey cattle breeders located in New York, N. Y. The bulls, Milly's Goddington Noble and Pioneer Coronation, were qualified for the awards on the silver medal records of three daughters each. The heifers were all bred and tested in Mr. Young's herd.

## "Milly's Goddington Noble"

Milly's Goddington Noble is a homebred bull out of the double medal of merit winner, Sensation's Mikado's Millie, who was mentioned

at the first of this article. He received his silver medal award at 11 years, 8 months of age and has seven tested daughters whose records average 606.40 pounds butterfat. In addition to the three qualifying silver medals there are two gold medals in the list.

Milly Eminent Fern was the first silver medalist and the youngest, starting on test as a yearling. In spite of the fact that she was extremely young she produced 543.90 pounds of butterfat, 9,478 pounds of milk in 365 days.

The next on to climb the ladder of success was Milly Lena of Don. She yielded 568 pounds of butterfat, 10,944 pounds of milk in 305 days as a junior 4-year old.

Milly Fairy, not content with a silver medal took a gold on as well. Starting on test at 4 years, 11 months of age she produced 790.63 pounds of butterfat and 16,513 pounds of milk in a year. This record holds a state age-class championship for milk production in the 365 day testing division.

The other gold medal award was for the record of Milly Blue Violet, who produced 757.66 pounds of butterfat, 14,663 pounds milk in 365 days as a 6-year old. All of these were milked three times a day.

## Pioneer Coronation

Pioneer Coronation has a silver medal sire and grandsire, and his gold and silver medal dam is a daughter of a gold and medal superior sire. The new medal bull received his award at 7 years, 5 months of age. He was bred in the herd of W. M. Anderson, Philadelphia, Pa., but has been in the Young herd since he was five months old. Of his twenty two registered progeny seventeen are heifers.

The seven tested daughters of Pioneer Coronation have an average yield of 567.91 pounds of butterfat. All made silver medal records and one won a gold medal as well.

Pioneer Noble Goldie, the first silver medal producer, yielded 780.18 pounds butterfat, 14,118 pounds milk in 365 days, and started on the

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# Quality Food for Vigorous Health

At the present time too much emphasis cannot be placed on the importance of the right kind of food.

(Editor's Note—Recent rejections by the army of large numbers of selectees because of physical deficiencies has emphasized once more the problem of human nutrition and the importance of providing every citizen of our country with the right kind of food—food for positive vigorous health. The subject of human nutrition was the topic discussed when the South Carolina State Nutrition Committee met in Columbia. Three members of the committee were participants in this broadcast. Taking part in the broadcast were: R. A. McGinty, Vice Director of the South Carolina Experiment Station, Miss Ada M. Moser, in charge of Home Economic Research, and Dr. E. J. Lease, Associate Chemist, both of the Experiment Station staff).

McGinty—Mr. Sherman this question of nutrition is one which is of direct concern to everybody who eats and that of course means every one. Since it's not long until supper time I think the subject is a timely one. Both Miss Moser and Dr. Lease are greatly interested in nutrition and both are working in that field. Miss Moser has made a survey of the diets of rural families all over the state and knows pretty well what our eating habits are. Miss Moser, I believe there is a popular conception of Southern eating which visions an abundance of all kinds of food such as fried chicken, roast pork, game, hot breads, vegetables, jellies, and so on, all against a background of fine old Southern hospitality. Is this a true picture of our food situation as we find it today?

Moser—Well, Mr. McGinty, there are some families who have such abundant diets, but unfortunately there is another less pleasant picture—that of families living largely on corn-meal, white flour, fat pork, molasses, and having very few vegetables and little or no milk, eggs, or fruits. However, by far the larger number of South Carolina families live on diets which fall between these extremely good and extremely poor ones. In our survey which you mentioned we have secured weekly food records from white and negro families in different sections of the state in such way that we have a fairly good picture of the quantities of different foods eaten the year around and whether these foods supplied enough protein, minerals, and vitamins for good health.

McGinty—About these vitamins and minerals, Dr. Lease, you have been doing work on the vitamin and mineral content of food products,

can you tell us what foods typical of the South are not only palatable but are also rich in vitamins and minerals?

Lease—Well, take sweet potatoes, for instance. They're a good source of vitamin A which prevents night-blindness. They also have iron which we need to prevent anemia, and they have some vitamin C to keep us from having scurvy. Green leafy vegetables, like our turnip greens, and collards, supply not only vitamins A and C, and iron, but also calcium, which is used in building bones and good teeth. Green leafy vegetables also contain various members of the **vitamin B complex** such as riboflavin, nicotinic acid, etc., which help prevent pellagra and other diseases.

McGinty—Dr. Lease, I suggest you would tell us a little about night-blindness and its cause.

Lease—It is a term applied to a condition that makes people stumble over objects in dim light or partial darkness because they can not see under such conditions. It is caused, as I said, by a lack of vitamin A. England recognizes the extreme importance of good nutrition and we understand are enriching the diet of pilots of the Royal Air Force with high levels of vitamin A so that they can see targets and planes better at night. Thus they are applying the scientific principles that vitamin A prevents night-blindness and aids vision in dim light.

Moser—During the last war vitamin C deficiency was very common and is said to have played a big part in breaking down the morale of the German people. Today they are guarding against such a deficiency by the use of synthetic vitamin C. They haven't yet learned how to synthesize vitamin A and must still obtain it from natural food products.

McGinty—Miss Moser, a while ago Dr. Lease mentioned pellagra. Do we have much pellagra in South Carolina, and can eating the right foods keep us from getting it?

Moser—Well, we still have around 1500 cases of pellagra reported annually in South Carolina. These could be prevented by the use of certain foods, which are usually available—

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**QUALITY FOOD FOR VIGOROUS HEALTH . .**

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for example, milk, lean meat (especially liver), fish, peanuts, and leafy greens such as collards and turnip greens. Whenever we find cases of pellagra serious enough to be recognized, we may be sure there are many more people that have mild and undetected forms of this nutritional deficiency.

McGinty—You have spoken of the value of milk, lean meats, fish, and certain vegetable foods in making the diet better. Do you think of any other improvements we might make?

Moser—Yes, indeed. For example, lightly milled cornmeal and grits are better than those which are highly refined, because they contain more vitamins and minerals. Whole wheat flour is superior to white flour. Home-made sugar cane and sorghum syrups are better than the highly refined syrups often used, because the former contain more iron.

Lease—It seems to me we ought to mention at this point that the public is coming to realize that highly refined foods have been robbed of their best parts by the refining process. Refined food often provides little more than energy, with little or nothing for maintaining or building up the tissues of the body. Today the average American eats 115 pounds of sugar a year. Forty years ago the average American ate only about 1-8 this amount of sugar. Our white flour is also more highly refined, our rice is stripped of every trace of its bran, our grits are whiter, and so on. All these refinements and changes have got us to the point where we secure 2-3 of our calories from these highly refined products and must get practically all our vitamins and minerals out of the remaining one-third.

Moser—Yes, that's exactly the situation. We like things sweet, our cakes, bread, etc. white and mellow. The public has recognized this and is trying to correct the deficiencies of certain refined foods by direct enrichment with vitamins and minerals. The new enriched flour, for instance, which contains several vitamins and a small amount of iron, is a big improvement over ordinary white flour. For the very small difference in price, I think it would be good economy for all South Carolina people to buy this enriched flour or have their own flour enriched at the mill. Whole wheat flour, of course, doesn't need enriching.

McGinty—Dr. Lease, how is this enriched flour prepared?

Lease—By thoroughly mixing a definite quantity of the vitamins with the flour and adding a small amount of iron salts.

McGinty—Enriched flour and enriched oleo-margine will no doubt help in a practical way to improve our diet, but are there not a lot of good foods, Miss Moser, that can be produced easily in this locality?

Moser—Yes, there are sweet potatoes and green leafy vegetables already mentioned. There are also peanuts, beans, and peas, which contain vitamin B, iron, and protein, lightly milled cornmeal and grits, another source of vitamin B and iron, and home-made syrup, important for its content of iron. Our people should not suffer from dietary deficiencies if they are able to obtain in addition to the vegetables and cereals a reasonable amount of milk, eggs, and lean meat. However, the facts are that almost 1-4 of the white farm families studied and 1-2 of the negro families had diets which were definitely deficient. A large percentage of the diets could be rated as only fair. Only about one-third of the white farm family diets and one-tenth of the negro family diets could be regarded as fully satisfactory.

McGinty—In a state where nutritious food can be produced in abundance, it seems incredible to me that such a large proportion of our rural families should not have an adequate food supply all the year round. In making your study of diets, Miss Moser, did you select families who could be thought of as having a low standard of living?

Moser—No. We tried to study families that represented neither the lowest nor the highest levels, but rather the large group between these two extremes.

McGinty—Well, what is the explanation for the large proportion of deficient diets?

Moser—There are several reasons for that. We found that if farm families did not produce good supplies of milk, eggs, vegetables, fruits, and lean meat, they usually did not get an adequate supply of these valuable protective foods.

McGinty—Couldn't they have purchased the foods they didn't produce but needed for protecting their health?

Moser—Some were not financially able to purchase the needed foods and if they did not produce them, went without. Others could have had good diets if they had known how to select the right foods. There were a considerable number of simple diets which, due to careful

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# Recent Trends of the Family

By C. B. FELLERS, '43



Courtesy S. C. EXTENSION SERVICE.

The farm family's standard of living is approaching that of the urban family.

Everywhere the family is the basic unit in the composition of society. As the most fundamental primary social group, it is the arena in which the major part of the individual's personality is formed. The family has its variations from region to region, from New England to Southern plantation and Western plain. It is only natural that variations would occur, but in essentials it is much the same. It is a genetic group bound by kinship and marital ties consisting of father, mother, and children, living together under one roof.

The farm family is a working unit as well as a living unit. The occupational environment puts all the members of the family group into close contact with each other. With this close intergration the rural family remains to be more permanent than the urban family. There is a greater dispersion of rural families causing a more isolated and self-maintaining group. Today in America the rural families are producing the bulk of the future population to be consumed by the city.

Changes from the rural family of the colonial days began in the growing urban centers of the nation. More recently many of the city's influences have been diffused to the country with the result that the rural family is now undergoing decided changes. In 1880, we were a nation almost entirely rural with 26 percent of the popu-

lation urban, but today the picture has decidedly changed with over one half (53 percent) of our population urban. The rural non-farm which include the sub-urban population, villages (under 2500 population), part time farmers who cultivate less than three acres, and the highway dwellers are steadily increasing. The migration from the rural sections are playing a big role in molding the traits and characteristics of our families.

The importance of the family of today is declining from that of the early American family mainly due to the industrial revolution. Institutional functions of the family and the importance of the family in the formation of character has declined. These and similar changes in the economic function of the family are reflected in the shift of occupations from the homes and the increased employment of women outside of the home. The economic functions once performed within the family group are now largely transferred to specialized agencies.

Along with the changes in functions recently have occurred important changes in family organization. According to the sixteenth census of the United States (1940) the changes in family organization may be summarized as follows: larger number of families, increasing 16.6 percent from 1930 to 1940; the size of the house-

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# Advantages of Crop Rotation

By R. N. GLEASON, '42



Courtesy S. C. EXTENSION SERVICE.

Soil building crops, such as *crotolaria* must be included in a crop rotation.

The practice of growing different crops successively in a certain prescribed order on the same land is known as crop rotation. Rotation of crops is based on a long-time plan and includes crops that are adapted to the environment and that fit into a profitable farming system. Good rotations favor the maintenance of soil fertility, the control of many plant diseases, and the control of weeds.

Crop rotations necessarily include legume and sod crops if the fertility of the soil is to be improved. These crops promote nitrogen-fixation and maintain the humus content of the soil. We must remember, however, that rotation of crops is one factor in maintaining soil fertility, and for complete maintenance, manures and commercial fertilizers must be used in conjunction with crop rotation. The farm land is protected against erosion, the most easily recognized of the soil depleting forces, by a growing crop the entire year. Therefore, crop rotation may be used to advantage on rather steep land.

Diversification is accomplished best through crop rotation. It pays a farmer better to have several important enterprises rather than only one; thus providing against total failure. Diversification distributes the income over the year and provides a full year's work for men, machinery, and horses.

There are many pathogens that remain from season to season in the soil, living on plant refuse from the previous crop, and when susceptible crops are grown year after year these pathogens accumulate to a point which makes production unprofitable. It is for this group of pathogens that rotation is important as a control measure. If unsusceptible crops are substituted these organisms may be "starved out" and their populations decreased. We should keep in mind, however, that the efficiency of rotation as a control measure for diseases depends on using clean seed, seedlings, or bulbs and following field-sanitation measures. The cereal rusts, mildews, most of the cereal smuts, and late blight of potatoes are not controlled by rotation of crops because the spores of these diseases are readily carried from infested to non-infested fields by the wind.

Fighting weeds occupies about 30 percent of all the time a farmer spends in cultivation of crops, according to experts in the United States Department of Agriculture. Crop rotation is the most economical and most effective means yet devised for keeping land free of weeds. A well arranged sequence of tillage and cropping is more easily practiced than any other known method; however, not all one-crop farms are weedy. As a rule weed problems on farms where crop rotation is practiced are not as severe as those on farms devoted for one reason or another to a single crop.

Farmers should consult their county agents or agriculture teachers as to the rotation best suited for their respective areas.

When the remaining leaves have fallen from the apple trees, they should be plowed under along with the fallen apples and other refuse. This practice will aid in the destruction of the spores of Bitter Rot and Apple Scab, which live overwinter on the leaves and refuse. In addition this will disturb the Coddling Moths, Oriental Fruit Moth, Plum Curculio, Spring Cankerworm and the Grape Rootworms in their dormant stages in the ground and bring about the destruction of many due to exposure to cold, rainy weather and their inability to return to the soil.



# Soil Conservation Demonstrations

By C. B. FELLERS, '43

These demonstrations are an effective means of presenting new methods of soil conservation to South Carolina farmers



Terrace building is a way of bringing an eroding farm back into its own.

During the month of November, there were two soil conservation demonstration farm schools held in South Carolina, one in the piedmont section and the other in the lower part of the state. The soil conservation demonstrations for the piedmont and the lower state were held at the farms of Harry W. Shealy, Newberry County, and Ira B. Newsom, Lee County, respectively. At the two demonstrations practically every county in the state was represented. The attendance exceeded all expectations, with 1154 farmers and agricultural leaders attending the demonstration in Newberry County, and 740 attending the lower state demonstration.

The complete one-day soil conservation demonstration farm schools were sponsored by the state Extension Service, Soil Conservation Service, State Forestry Service, and State Experiment Station and all arrangements made and demonstrations outlined by the joint engineering and agronomy committees of these services. It is the thinking of these service organizations that efforts should be correlated and all demonstrations and practices carried out on a single farm here and there so that farmers can go there and see the whole picture of diversified farming and proper rotation and soil conservation practices being carried out on one unit.



The practical use of a home-made lime spreader for a more profitable agriculture.

As the people arrived they were divided into squads of about one hundred, instructed about the day's activities, and put in charge of a squad leader who conducted them over the entire farm, on all parts of which the most practical known methods of soil conservation and improvement and land use being carried out.

Fifteen definite soil conservation and farm improvement demonstrations were under way partly finished and portions being built. These were wildlife, fire lane, interplanting pine, timber-stand improvement, small grain seeding, tree planting, pond, kudzu, new pasture development, terrace building, annual grazing crops, rotations, marketing timber, irrigation, and ditching.

Lime was needed on practically all of our soils for a more profitable agriculture, it was pointed out, and a home-made spreader was demonstrated. Commercial lime spreaders are almost unattainable now, on account of national defense work, and plans for a home-made one are being perfected here at Clemson College and can be secured thru county agents.

Legumes are the basis of economical soil building, it was shown, and inoculation was urged. The scientific laboratories have isolated the more virulent strains of bacteria that gather

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# Nitrogen Needs and Sources

By J. B. PATE, '43

Nitrogen is essential to plants because it plays a fundamental part in the formation of proteins, which are essential to living cells. Nitrogen has received more attention than any other element in research work. The reasons for this are:

1. The amount of Nitrogen is low in average soils.
2. Plants use large amounts of Nitrogen in growth.
3. Nitrogen is very readily lost in drainage.
4. Nitrogen often becomes unavailable.
5. It produces an immediate effect on plants.
6. An over application of nitrogen may upset the nutrient level of the soil.
7. Nitrogen is expensive in form of a commercial fertilizer.

Nitrogen is absolutely essential to the maintenance of soil fertility. It is so necessary for plants and animals that all life would cease to exist without it. Nitrogen plays a major role in the development and functions of protoplasm in plant and animal structures. Growth and reproductive tissues especially require nitrogen. Nitrogen is more responsible for the rate of growth of plants than any other element.

The mineral compounds of the soil, such as calcium, magnesium, and iron compounds, originated from the decomposition of original rock material. However, the nitrogen compounds in the soil are derived from the air. The air is composed mostly of a mixture of nitrogen and oxygen of which about 80 percent of this is nitrogen. This nitrogen is inert and will not enter into combination with other elements. Plants are unable to use this nitrogen in the air. There are a few ways in which this nitrogen in the air may get to the soil. The most important way is fixation by organisms. There are two types of these organisms. The legume fixing organisms live on the roots of legumes. They get carbohydrates from the plant and in return they take the nitrogen from the air, leaving it in a form that can be used by plants. There are also certain free-living organisms which fix nitrogen. A very small amount of nitrogen in the air is fixed by electrical fixation. Also a small amount of nitrogen is present in precipitation.

The amount of nitrogen present in South Carolina soils is very low, even below the average amount in the soils of the United States. Nitrogen is returned to the soil by crop residues, green manures, farm manures, commercial fertilizers, nitrogen in precipitation, legume fixation, and free fixation. Nitrogen is lost from the soil by leaching, crop removal, erosion and denitrification. The farmer must be conscious of how easily nitrates are leached from the soil. Erosion is a serious problem for South Carolina farmers, because not only is nitrogen lost from the soil, but also other essential elements. Denitrification is the reduction of nitrates to the elemental or ammoniacal form which is lost to the air. Probably three of the best ways to increase the nitrogen content of the soil are by the growing of green manure crops, growing of legume crops, and applying farm manure. These methods are cheap and the average South Carolina farmer should be able to carry out these practices. The application of commercial fertilizer is also an excellent way to increase the nitrogen content, but it is rather expensive.

There is a general belief prevalent that nitrogen must be in the nitrate form to be used by plants; however, this is untrue. There is fairly well established evidence that nitrogen in the form of ammonia and organic compounds may be utilized by the plant.

Nitrogen in the organic matter of the soil is broken down. First the nitrogenous compounds are broken down to ammonia; a process known as ammonification. Nitrification is the process by which the ammonia is changed into nitrites then nitrates. These processes are carried on by bacteria. There are numerous factors which influence nitrification. The factors that the farmer should know about are aeration, temperature, moisture, active lime, fertilizer salts, and the nitrogen-carbon ratio.

Since nitrogen is so essential to plant growth, is so easily lost from the soil, and is rather high as a commercial fertilizer, every man of the soil should be interested in it. The average acre of soil in South Carolina contains only 800 lbs. of nitrogen, thus the South Carolina farmer needs to be "nitrogen conscious."



# Post-War Crisis in Prospect

By J. L. Schaffer, '43



Courtesy S. C. EXTENSION SERVICE.

Food produced at home will help avert post-war crisis

The tremendous rise in production to meet the national emergency may cause one of the greatest problems that has ever faced our rural population, unless definite steps are taken immediately. At the rate of approximately two million a year, people from the farm areas of the nation are going to the big industrial centers to help build our armed forces in the emergency. These jobs are providing the people with a better livelihood than they can receive from farming. During this period of emergency, the farmers will experience greater and greater difficulty in securing labor, and they will have to mechanize their farms as much as possible in order to plant and harvest their crops. Their need for farm labor will decrease as the mechanization of farms increases.

As with all wars, we pray that some day this war will end. At the conclusion of hostilities, the army workers will no longer be needed to provide arms and machines for our forces; and they will be fired from their lucrative jobs. What will happen to these people who left farm areas to go to the cities? The cities will no longer need them when the emergency is over, and the farmers will not need them because their farm work will be done by machines instead of human labor. This situation is to be considered for the effects are far-reaching. We certainly do not want to have another post-war depression like the one that followed World War I, nor do we want to see hasty mass migration of industrial laborers back to the farm. If they return to farms

either as laborers or subsistence owners, there is a likelihood of over production, and this will cause a depression of farm prices.

It is clear that the problem will have to be tackled on a national basis; communities or states will not be able to handle it by themselves. A program similar to the W. P. A. could be used to cushion the shock, but the big problem will remain. How can production be maintained at the present emergency level with the goods produced being consumed by the civilian population instead of the army? In all future long-range planning by the government, this problem must be given primary thought.

## FARMERS WAKE UP AND SEE FACTS

"Mr. Smith how do you like the government terraces?"

"Well, I can't say that I like them because last year my terraces held when Mr. Morgan's new government terraces washed away and ruined his field. I think my old terraces will satisfy me since they hold most of the time."

"How long had the government terraces been constructed?"

"About six months, I think."

Mr. Smith doesn't have any confidence in the government terraces because a big rain washed over them before they were settled.

The above experience is taking place in the majority of farm communities in the South—not necessarily about terracing, but other government projects and soil conservation practices. Farmers don't realize the true facts; they jump at conclusions. Farmers investigate only one side of the problem; therefore, their picture is warped. If a practice fails once under certain conditions, that doesn't mean that the practice is useless. We must investigate the possibilities of failures and the causes of failure.

Let's not be narrow-minded, biased, or prejudice. A good motto would be "Give practices, theories and etc., a fair, honest-to-goodness trial and study before we condemn or criticize them."

In young apple orchards the overwintering nests of the Brown-tailed moth may be collected and destroyed.



## They Also Serve . . .

A story about dogs is always appealing

By HARRIET LAUNA HEFNER



These working collies have cut one certain sheep from the rest of the flock

Just about the most popular single event during the Agricultural Show at Clemson College, was the sheep handling demonstration put on by Colonel E. W. (Ted) Cook, of Animal Husbandry Division. Training collies to work has been Colonel Cook's hobby for many years. Colonel Cook is a master hand at teaching collies what to do, when to do it and how to do it in handling sheep, and just in passing let me say it is amazing what a dog can be taught to do and how useful he can be. Over and over again the question is asked, "how does he do it?" I asked it along with the rest and sought the answer from Colonel Cook himself.

To begin with, Colonel Cook loves dogs and particularly does he love his dogs, but it's better to let him tell his story in his own way which is a story that has to do specifically with collies and his everyday work at Clemson. "Of course," he says, "other breeds can be trained to work to a certain degree" but his specialty is to train Highland or Border Collies only.

In a special interview, Colonel Cook puts it this way—"Border Collies respond particularly well as the working instinct has been bred into them for hundreds of years. The Highland or working collie, as they are more commonly known, traces its ancestry back to the working strain of dogs bred in the hills of Scotland through countless generations. The open range prevails throughout the Scottish highlands. There are particularly no fences there, so a dog is indispensable in that region for herding sheep and keeping the different flocks separated." Mr Cook's

two beautiful imported collies that work with almost human intelligence, and they delight in showing their skill before the admiring crowds that gather to see them. They watch their master intently for instructions as he starts across the pasture. A low whistle, a wave of his arm and off they go to obey his command. Signals are given by various whistles or waves of the arm instead of spoken words. It is Colonel Cook's experience that "often dogs are working at great distance, too far to hear the voice, but they can hear a sharp whistle or see a motion of the arm. A peculiar but advantageous characteristic of the Border collie is that the paws of the front legs usually point outward. This aids them in stopping suddenly and turning quickly. Border collies work without barking, a most commendable trait. Quickly and silently they circle a flock, gently urging the animals to go where they are wanted. The habit of silence in dogs is greatly to be desired. A noisy or barking dog may frighten animals causing them to run in all directions.

In color, working collies are usually black with white markings, some few are jet black and in rare instances one is found tri-colored—that is, some tan is included in the marking. The head is short and broad with intelligent eyes set well apart. The body of this breed is rather slender and is covered with a heavy coat of smooth medium-length hair. There are four principle strains of collies: the Bearded, the sable and white, the black and white and the miniature or Shetland Sheep dog. Each strain has its distinct characteristics and uses. The Bearded collie is used mostly for herding cattle and is a rough, long-haired dog, blue-grey in color. The handsome long-headed sable and white collie, so numerous in this country, are bred chiefly as companions and for show purposes. These dogs should not be confused with the type we are discussing which has gained worldwide recognition through the famous sheep-dog trials in England and Scotland. The short head black and white working strain is the only collie Mr Cook is interested in training. He likes to begin the training when the puppy is around six to eight months of age. At the beginning the puppy is allowed complete freedom of the pastures, is permitted to follow

Continued on page 18

# A New Method of Treating Fence Posts

By E. M. JOHNSON, '42

As our forests disappear, posts will have to have better care if they are to serve to their best advantage

A cheap and simple method of treating fence posts is fast becoming the cry of farmers in the state today. Under the general program of diversified farming, more livestock is a major topic. This means more pasture and better pastures. Many farmers have already learned that "King Boli Weevil" now wears the crown of "King Cotton" and are turning parts of their cotton acreage into pasture.

Work on a non-pressure method of treating Southern pine posts, using a solution of either copper sulphate or zinc chloride, is being carried on at present by members of the Experiment Station staff.

The principle of the method used was first discovered by Dr. M. Boucherie, a Frenchman, but was pushed into the background until a few years ago. In the original method the fresh cut poles were placed in the solution and the pressure head plus capillary action of the liquid forces the solution through the tree.

Not enough results have been attained to permit the leaders to offer permanent recommendations, but they have presented tentative suggestions as follows:

The trees shall be felled and cut to desired lengths at least 24 hours before treating. This allows the excessive gum to accumulate on the ends of the posts. Either earthen or wooden containers (halves of wooden barrels are recommended) are necessary as the solution reacts readily with metals. Two pounds of salts to one gallon of water will give the correct concentration if all of the crystals are dissolved.

Just before treatment, from one to two inches of the butt end of each post should be sawed off and the freshly cut end placed in the solution with the post held in a vertical position. Two quarts for each cubic foot of post to be treated will be sufficient.

The post should be removed from the solution after three days and about one inch sawed off the top end. The top end should then be placed into the same container. No more solution should be added.



Courtesy S. C. EXPERIMENT STATION.

During treatment posts are placed in half barrels containing a solution of copper sulfate or zinc chloride

When all of the solution has been absorbed, the posts should be removed from the container and allowed to air-dry for at least one month before setting.

The cost of treating an average post with either salt is about five cents per post. Copper sulphate is the easier salt to obtain and work with, but it seems to be more corrosive to metal than zinc chloride. Past records have shown where both salts have been used as a wood preservative in other processes, a copper sulphate treated timber remained in a preserved state approximately five years longer than one receiving zinc chloride. At present more treating is being done in the state with zinc chloride, but work is being carried on on the corrosion of copper sulphate. In the future, if this is successful, copper sulphate may become the more widely used salt.

The extension of the process is increasing rapidly due to its adaptability to every size farmer. Southern pine is available in every county in the state. Someone has said that the trees that need to be thinned out of our forests today would many times exceed the need for fence posts in the state. The reason why fence post treatment is increasing is because the process is so simple and economical that even the small farmer can do it.





## BETWEEN THE

### Judging Team to Chicago

The Clemson Judging Team composed of J. B. Griffith, H. H. LaMaster, G. W. Edwards, M. D. Watkins, H. L. Crouch, and Roger L. Bull attended the Annual National Livestock Judging Contest and Show in Chicago, Illinois. This group accompanied by Professor E. R. Hauser of the Animal Husbandry Department, toured through Kentucky, Wisconsin, and Illinois, where they competed with other college judging teams on all classes of livestock.

THE AGRARIAN

### A. S. A. E. News

The student branch of the American Society of Agricultural Engineers initiated fourteen new members this semester—six seniors, two juniors, and six sophomores. The club has made Christmas cards which will be sent to all agricultural engineering alumni and also will be sent to student branches of A. S. A. E. in other states.

THE AGRARIAN

### Experiment with Sweet Potatoes

Mr. G. H. Dunkelberg, associate agricultural engineer, and Dr. J. B. Edmund, associate horticulturist of the S. C. Experiment Station, are working on air conditioned storage compartments from which information will be obtained on the affects of variations in temperature, humidity, and air exchange on sweet potatoes in storage.

THE AGRARIAN

### Among the faculty and the experimental staff

James M. Stepp, research specialist in rural industries in the department of agricultural economics and rural sociology, was the Alumni speaker at a homecoming dinner at his Alma Mater, Berea College, Berea, Kentucky, on November 21.

Dr. G. B. Killinger, associate soil scientist, left Dec. the first to join the experimental staff of the University of Florida where he will continue his work. Dr. Killinger from Iowa has been with the experiment station at Clemson for the past four years.

L. E. Scott of the Sand Hill Experiment Station near Columbia, S. C. is now at the University of Maryland working toward a doctor's degree.

He has been employed by the Horticulture Department in research work of peaches, grapes, asparagus, and sweet potatoes at the Sand Hill Station.

L. O. van Blaricom, in charge of the new horticulture cannery, has gone on a vacation to his home in Oregon. Mr. van Blaricom will spend a week in California, observing the canneries and the food research organizations.

Dr. G. H. Collings is now editing a new book for the Blakiston Company named, **Nature and Prevention of Plant Diseases**, written by Dr. S. Starr Chester, head of the department of plant pathology at the Oklahoma A&M. College.

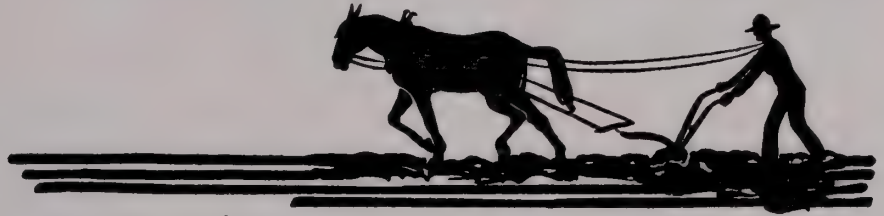
Dr. J. T. Kroulik is now assistant to Professor W. B. Aull, vice dean of the school of agriculture and professor of bacteriology. Dr. Kroulik did his undergraduate work at the University of Texas and also received his master's degree from there. He obtained his Ph.D. from Kansas State. Before coming to Clemson, Dr. Kroulik was employed by the state board of health in Texas.

Dr. H. P. Cooper has recently delivered a series of ten lectures to enlighten his staff on the physical and chemical factors involved in nutrition.

G. H. Aull and J. M. Stepp, of the department of agricultural economics and rural sociology, attended the annual meeting of the Southern Economic Association at Nashville, Tennessee, November 13-15. The meeting was devoted largely to a discussion of current aspects of the economic developments in the South.

G. H. Aull, head of the department of agricultural economics and rural sociology, was the principal speaker at a Thanksgiving dinner meeting of the Interstate Committee of the Y. M. C. A. given by Mr. Charles Cannon, at Kannapolis, N. C., on November 25. Doctor Aull used as his subject, "Some Economic Teachings of the Bible."

Dr. W. H. Mills attended the Annual Harvest Festival at Penn Industrial School on St. Helena Island on November 28. Dr. Mills is a trustee of the school.



## FURROWS

### Alpha Zeta Active

Recently eight seniors and seven juniors were initiated in the Alpha Zeta. This brings the total number of members to twenty six, the largest in the history of the South Carolina chapter. With this large number, the chapter is in the midst of a very active year. Plans are being made to contact all alumni members of the S. C. chapter of the Alpha Zeta, and a news letter will be sent to all these old members. Coaching classes in all agricultural subjects will be held for freshmen during the week before exams. Lately, an informal "smoker" was held in the Y. M. C. A. club room.

— THE AGRARIAN —

### Alumni

O. K. Pressley (Class 1929), graduate in animal husbandry, has recently been promoted from a captain to a major in the U. S. Marine Corps. Major Pressley was captain of the football team his senior year, and he was an all American center.

J. M. Dunlap (Class 1923), dairy major is owner of the Cleveland Ice Cream and Milk Products Company in Cleveland Tennessee. Mr. Dunlap is active in civic clubwork, and he is instrumental in the rotory and dairy calf club work.

Max Chapman (Class 1936), graduate in Ag. Ec. from Sandy Springs, has recently been promoted from a first lieutenant to a captain in the Marine Corps.

R. N. Davis (Class 1939), graduate in Ag. Ec., has been appointed as an assistant county agent of Aiken County. Rhett has been with the extension service at Clemson since his graduation.

— THE AGRARIAN —

### New Water Plant

Four thousand feet of ten-inch cast iron pipes are being laid on the campus as part of the \$140,000 filter plant system now under construction at Clemson. The new purification plant will replace a long out-dated settlement basin which now supplies Clemson's water. The present water plant was installed more than twenty years ago, when Clemson's enrollment stood 1007 students.

### Collings visits Research Center

Dr. G. H. Collings, professor of soils, recently visited U. S. D. A. Beltsville Research Center located north east of Washington, D. C. Dr. Collings said the research center covers 14,000 acres with 70 miles of undeveloped roads. Millions of dollars will be spent for improvement and necessary buildings for the project. Eventually 1600 research workers are going to be employed at the Beltsville Research Center to do agriculture research work Dr. Collings says.

— THE AGRARIAN —

### Horticulture Exhibits

For the past several weeks the horticulture department have been demonstrating different varieties of peaches canned in the new cannery at Clemson. The exhibits have been held for peach growers, agriculture teachers, and county agents in which the different varieties were actually seen and tasted.

— THE AGRARIAN —

Control of the Pecan Twig Girdler may be accomplished by picking up and burning the severed branches which contain the larvae. Disposal of the shucks will materially decrease the Hickory Shuck Girdler; and plowing under of the shucks will kill many of the adult Southern Green Stinkbugs, which cause Black Pit and Kernel Spot.

— THE AGRARIAN —

To prevent winter injury to small pecan trees avoid late cultivation; and as a final measure, burlap sacks may be wrapped about the trunks of the trees and removed in the spring. Winter injury has never been reported on trees over nine years of age.

— THE AGRARIAN —

Early preparation of garden plots will have a two-fold advantage. If the first good days of spring are spent in preparation, planting will be delayed too long and yields may suffer severely. This "cleaning up" where food plants have grown is a good supplementary control for Mexican Bean Beetles and other garden and truck crop pests.



## TRAINING COLLIES TO WORK

at will and become thoroughly acquainted with its master and the animals. The first lesson deals chiefly with obedience. Mr. Cook says "Nothing can be accomplished until obedience is established. Some puppies, like some children, are more hard-headed than others and each individual requires a different technique, but with time and patience the task can be accomplished. At first, I teach the puppy to lie down when the command is given. In order to help him understand what I mean, I give the command and at the same time gently push him down. If this is practiced a few times faithfully, the dog will soon realize what is required and will be willing and eager to lie down of his own accord when the signal is given. Let him learn one command thoroughly before attempting another. Confusion will follow too many commands hastily given. Always let each lesson soak in thoroughly before attempting a new one."

"Now," Mr. Cook continues, "after the puppy has learned to obey the signal to lie down he is ready to learn to 'heel'; which means that he must always be behind the master not at the side nor the front. If a dog is permitted to wander from side to side, from back to front, etc., he will soon have the feeling that he is the leader. That's bad. Therefore, I speak firmly when there is the slightest straying from orders. The dog must know who is master. It is often necessary to put a leash on a puppy when he is first learning to 'heel'. The leash is kept loose and the puppy is not permitted to put any pressure on it. He must learn to walk with his forefeet parallel with the trainer's heel and stay there regardless of other attractions. After using the leash for several days it can be removed and the routine repeated until the lesson is perfectly learned."

"The puppy should next be taught to round up a flock of sheep. By this time his natural herding instinct (if he is the type that is really worth training) will assert itself and he will be eager to chase after the animals and get ahead of them. I begin this lesson by starting the pup from behind me thus giving him the tendency to run in a wide circle. Otherwise, if started from the front the puppy would almost certainly run too close and cut in on the sheep. As soon as he has circled to a point ahead of the flock I give him the signal to lie down. If he fails to respond, which he will probably do at first, he is brought



Collies are taught to find strays and bring them back to their flock in safety

back and tried again and again until he does obey. I let him stay down only a second or two and then give him the signal to bring the animals to me. For first lessons, I am very near the flock. More space is added each time until soon the dog can be trusted at long distances and often when the animals are completely out of sight."

"Teaching a dog to drive the flock away from the master is quite difficult. This is contrary to his natural instincts of running to the head and also to his former lesson of going ahead and bringing the animals back, consequently much patience is required at this time. A pushing-away signal is given and practiced until he grasps the real meaning and learns to stay behind the flock and urge them forward. A dog must be completely under control before this lesson is attempted, as it is one of the hardest for him to understand."

"After the dog is thoroughly familiar with each different signal and all lessons have been perfectly learned, cutting-out sheep from the rest of the flock, or 'shedding' as it is termed in Scotland may be undertaken. In order to cut-out a required number from a flock, I place the dog on the opposite side of the sheep from me then I separate the desired number from the others and walk in the space between the two bunches. The dog is now called to me and we drive one bunch away from the others. This performance is repeated until the dog understands my command to go into the flock and separate the ones wanted. Cutting-out is fascinating work for most dogs. They like it so well in fact that they usually want to do this part of the work when there really is no occasion for it."

It is a thrilling experience to see Colonel Cook working with his dogs and the college flock in the beautiful rolling pastures of Clemson, formerly the plantation home of the South's great leader, John C. Calhoun. These marvelous dogs, with their keen eyes on their master—watching his every move, reminds one of the members of a well trained orchestra or choir, who watch their leader intently as he guides them through their measures. "This close observance," reminds Colonel Cook, "is a most desired strong point in a dog, one which should be sought in every working collie. I want a dog that will watch me and not one that I have to watch", is Colonel Cook's philosophy.

### THE VILLAGE IS HOLDING ITS OWN

There has been much distress due to the fact that the American village is slowly but surely declining. This fear is unnecessary because the American village is definitely holding it own.

A village is an incorporated place that has a population between 250 and 2500 people. To judge how well a village is doing, we first must see if they are maintaining their proportion of the total population and whether their average population is increasing or decreasing. Then we must find if all the villages that were incorporated by 1910 are still in the village class or have passed up into the urban class (over 2500) or declined into the hamlet class (under 250). In considering the proportion of village population to the total population, we find that the village had 8.9 percent of the total population in 1910, 8.5 percent in 1920, and 7.5 in 1930. Although this may seem as though there has been a definite decrease, we must remember that the population has increased in the whole country by a large amount and although the rural village has grown, it has not grown in the same proportion as the rest of the nation. Actually, the village population has increased 32.5 percent from 1910 to 1930. In 1910 the average village in the United States had 833 persons while in 1930 it had 1104 inhabitants. During this period, the South has doubled in village population. It had an average of 796 people to the village in 1910 while in 1930 it had an average of 1,193.

Of the villages studied, it has been found that agricultural villages have the greatest tendency to remain stable. While agricultural villages have grown since 1910, their growth has been small in comparison to villages engaged in industry, mining, and fishing.



## Clemson College Laundry



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## *The Farmer to the Front!*

By W. S. JACKSON, '43

What does the word National Defense mean to the work-a-day farmer who toils from sunrise until sunset to eke out a living from the soil? What part is the farmer to play in this National Defense program of ours? In an effort to meet the threat of other nations, we Americans can depend upon the farmers everywhere. We know that we can depend upon the men who live upon the land. It has been this way in the past, it is now, and will be the same in the future. Let us always keep before us the glories of their past records. Today, the American farmer is being called upon to play a major role in the service of our country.

As America settles down to all-out production, agriculture is again in the front lines. The farmer has to produce the "rock-bottom" for defense. As we open the throttle on our agricultural machine, we see that the farmer is confronted with a threefold task. First, he has to produce enough food to feed 130 million Americans. Second, he has to produce enough food to feed Britain, who incidentally is fighting with us. American food has been going to Britain at the rate of 250,000 tons per month. Third, he has to produce enough food to go into reserves, and stock piles to feed the impoverished people after Hitler is defeated. The question at stake now is—Can we produce enough feed for ourselves, England, reserves, and maintain our price level? We have the reserves and the organization. There are no other farmers in the world who can produce like the American farmers. There are remedies against surpluses, but there is no remedy against scarcity. The U. S. is the best fed nation in the world, but we still have room for improvement. It has been said that food is the "strongest weapon of democracy." We must produce the necessary food since it is one of the best ways to defend our democracy.

Secretary of Agriculture, Claude R. Wickard, made the following statement, "We've got to produce more of certain foods, because food is going to win this war and write the peace. Never before has the world been so hungry. Despite his victories, Hitler is desperate. Unless he can find food and oil in huge quantities, his conquest will become liabilities. There will be sabotage and revolt among the conquered people. And then Hitler will lose, but hunger will be stalking Europe." This is where the American

farmer will step into the picture and win the war. Intelligent planning and positive action is the "thing of the hour." South Carolina's 170,000 farmers have been asked to step up their agricultural production in 1942 to the greatest peak in all history, as a vital contribution in this all-out effort for democracy. This request comes directly from Secretary Wickard.

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# The Importance of Herd Improvement

By E. B. COLLINS, '43

"Cows with good bags, backs, and bellies are good milk producers."



Courtesy S. C. EXTENSION SERVICE.

A herd of this type is seldom a liability.

Before man became interested in dairying, nature's cow was probably very small and much like the wild deer. Native to the grasslands and forests of the warmer sections of the world, she produced milk for only two or three months each summer—just long enough for her calf to grow large enough to take care of himself in the wilderness.

The present domesticated dairy cow is a quiet, well-dispositioned animal. She is large and needs more than grass for feed. The constituents of milk, man's most perfect food, must be present in the cow's ration in excess to the nutrients necessary for body maintenance, or she can not continue to produce large quantities of milk over a long period of time. At present cows produce milk from ten to ten and one-half months each year.

There is a reason for this drastic change in one of nature's animals. It did not happen by mere accident. Through observation, study, and experimentation man found that the physical characteristics of any animal are determined almost entirely by the characteristics of the animal's ancestors. Knowing the quality of milk as a food, man realized his need of an animal that could produce great quantities of it. Having some knowledge of genetics, he began to breed high

producing cows with sires from high producing animals. The milk production per animal began to increase; and after some time, it was noticed that certain bodily characteristics were dominant among the high producers. It was found that when both sire and dam possessed a common desirable characteristic, the off-spring was superior to both sire and dam. On the other hand, if both sire and dam possessed a common undesirable characteristic, the off-spring was inferior to both sire and dam. This and other knowledge was taken into consideration, and the change in type and production of the dairy cow has become more and more remarkable.

Improvement should proceed along two lines—improvement in milk and fat production, and improvement in type. Though the animal breeder should pay more attention to type, and the utility dairyman more attention to production, neither of the phases should be ignored by either of the dairymen. Improvement in type may be brought about more quickly by the selection and use of sires which are prepotent in those characteristics which need improving. If the herd is large enough to permit culling, the elimination of those females which possess and transmit undesirable characteristics will effect a great improvement.

Continued on page 23



# Wild Life Conservation in the Piedmont

By J. K. CARTEE, '42

Erosion has robbed the majority of the farms in South Carolina. Too poor to produce profitable crops, the eroded areas are usually abandoned. Unless they are treated to check further erosion, these areas grow larger and rob the farmer of more of his soil. Fortunately, soil conservation and wildlife management can be effectively combined. Areas such as odd corners, eroded spots, field borders, and terrace outlet channels can be made to produce a crop of game birds, fur bearers, or other desirable types of wildlife. By healing the scars due to erosion with soil-conserving grasses, legumes, and shrubs, farmers may convert areas from costly wasteland into productive wildlife habitats.

The relation between wildlife management and soil conservation is so close that, by proper planning, the benefits of both may be achieved in the same operation.

All types of plants help check erosion, however, some are more desirable than others. Close growing crops such as the lespedezas are best. The bobwhite feeds on the seeds of lespedeza and finds cover in its luxuriant growth. A number of other plants are considered excellent in controlling erosion and equally beneficial as a source of bird food and cover.

Farmers, now, perhaps more than at any other time, appreciate the fact that increase of game depends upon improvement of the environment. This necessitates the distribution of patches of food and cover over the entire farm and the providing of a sufficient number of plants to supply wildlife needs the year round. These principles are practiced on Piedmont farms cooperating with the Soil Conservation Service.

If maximum wildlife production is to be obtained from farms, fire must be checked. The burning of crop refuse and of plant growth in fence rows and woodlands along field margins destroys conditions most favorable to wildlife and is to be discouraged.

Many field borders remain barren throughout the year because of shade, severe sheet erosion, and root competition. This is an ideal place to plant erosion-resisting crops for use by wildlife. Common and Korean lespedeza, Lespedeza

sericea, and Sudan grass are used quite extensively for the treatment of field borders in the Piedmont.

Farmers in the Southeast have indicated their desire to combine wildlife development with soil conservation. It is possible by cooperation between nature lovers, sportsmen, and farmers to protect wildlife by encouraging the proper use of land and good sportsmanship in regulated hunting.

## SOIL CONSERVATION DEMONSTRATION

Continued from page 11



A bird's eye view of the once eroding farm where the demonstrations were held.

nitrogen from the air and store it in the nodules of the roots of legumes, and these are now available through commercial inoculations. In this way the value of legume crops to the soil or for feed can be materially increased in many cases.

It is planned, according to Mr. E. C. McArthur of Gaffney, state president of the association of soil conservation district supervisors, to make this an annual affair so that farmers may come each year and watch these practices materialize into maturity. They all represent the best thought available on the various subjects, and farmers are invited to visit these demonstration farms yearly and see a farm that was eroding come back into its own by having applied the best known practices there.

## RECENT TRENDS OF THE FAMILY

C. B. FELLERS, '43

Continued from 9

hold has been decreasing, the average population per occupied dwelling unit in urban places in 1940 (3.6) was significantly smaller than that in rural territory (4.0). The urban families declined more rapidly in size since 1930 (9 per cent) than the rural families (7 per cent). The average size of the family has decreased because of the decline in the birth rate and possibly because of the splitting of households.

Families are becoming more diversified largely due to the modern facilities and improved means of communication and transportation. These various outside forces are tending to tear apart the unity of the family group and depend more upon individualism. Agriculture will be the last of the great industries to be operated on the individual family unit plan.

The craving for affection and the need of rearing children have undoubtedly been fundamental factors in making the family an omnipresent and enduring social institution.

## THE IMPORTANCE OF HERD IMPROVEMENT

Continued from page 21

The importance of each individual animal in the herd is little appreciated by the average dairyman, but there is nothing more important to his success or failure than his ability to recognize characteristics in conformation which tend to shorten a cow's productive life. The primary purpose of the dairy cow is the production of milk and butterfat. In order to be profitable, a cow must continue to produce large quantities of milk for a period of years. This can be realized only through the dairyman's effort to improve typical and productive characteristics within each animal of his herd.

To have high producing cows of good type is not the wealthy dairyman's hobby; it is this factor which has made him wealthy. Each individual cow in the herd must make her share of the dairyman's returns. Since body maintenance must be supplied in the ration before milk can be produced, high producers are much more economical in milk production than low producers. There is no place in a herd for cows that fall in the "liability" class. It doesn't take large sums of money to change a reasonably common

## THE NATIONAL COTTON COUNCIL OF AMERICA

By J. M. COTTINGHAM, '42

In November 1938, a group of men interested in increasing the world consumption of American cotton met in Memphis to organize The National Cotton Council of America.

The council is an Industrial organization with membership made up of delegates from the fourteen cotton states. The delegates are chosen by their State organizations, which represent the producer, ginner, merchant and shipper, warehouse, cottonseed crusher, and spinner branches of the Cotton Industry.

By concerted action the Council is devoting its efforts to the promotion and expansion of the consumption of American grown cotton, cottonseed, and their products. The recent "cotton craze" in women's wearing apparel was largely generated by the advertising campaign of the Council. The Defense Program and increased purchasing power have played a large part in the current record breaking domestic consumption of cotton, but much of the credit for the increase must go to the organized work of the Cotton Council.

The Council has a policy of opposing movements of any nature which will tend to restrict or discourage the consumption of cotton, cottonseed, and their products. An illustration is the successful fight which the Council has been waging against the taxing of margarine, manufactured largely from cottonseed oil produced domestically.

The Cotton Research Foundation, the research agency of the Council, is essential to the maintenance of the Cotton Industry, because only by hard, patient, scientific work can the Industry hope to keep up with materials which compete with cotton, cottonseed, and their products.

If the cotton farmer had rather grow cotton than any other crop, if he desires to compete successfully with new products and if he wants to keep a market large enough to allow him a profitable acreage, cooperation with the Cotton Council is a channel through which he can work effectively toward these objectives.

herd into a herd of good quality; but at the same time, it doesn't take many "boarders" to swindle all of the dairyman's profit. A reasonable amount of basic knowledge, sound judgment, and practical experience is the key to success which many dairymen have used.



# THE AGRARIAN PRESENTS

## WILLIS A. KING, Ph.D.



Willis A. King, Ph.D.

There is no greater proof of Clemson's greatness than by the achievements of her alumni. Many graduates at home and in every part of the country are doing an excellent job in their respective fields.

Dr. Willis A. King is an outstanding example of such an alumnus. He graduated with honors from Clemson in 1936 with a B. S. degree in Dairy Husbandry, and for his ability he received the Anderson Fellowship. He selected the University of Wisconsin for his advanced work, and here he received a research assistantship which lasted four years. In 1938 he received his M. S. degree, and in 1940 his Ph.D. degree. His advanced education was centered around nutrition, dairy husbandry, and biochemistry; however, Dr. King is proficient in other fields of chemistry and breeding.

At present, Dr. King is employed at the Dairy Research Station in Sussex, New Jersey. His work consists of research on the nutritional value of grass and legume silages. He is well qualified for this position, for his research assistantship at Wisconsin brought him in contact with

investigations on grass and legume silages, inter-relationships between vitamin A and vitamin C, and the relationship of vitamin K to sweet clover poisoning.

Although Dr. King is now residing in New Jersey, he is a Southerner as he was born and reared in Due West, South Carolina. Besides, he desires to settle in the South sometime in the future. To him the South has excellent possibilities of further development in dairy farming and in beef and hog production.

When asked of his opinion of the Clemson Dairy Department, Dr. King said Clemson has an excellent staff with qualities above the average of most schools. The barns and dairy cattle are of the finest; however, Clemson does lack some of the dairy manufacturers equipment that larger colleges have. All the available equipment is put to good use.

At Clemson Dr. King was a member of the Alpha Zeta and was elected scribe of this fraternity his senior year. He entered a southern essay contest sponsored by the Gulf State Steel Corp. and won the grand prize. He was a member of the Dairy Club and 4-H Club and president of both of these organizations during his senior year. He was also a member of the Y. M. C. A. councils his sophomore, junior, and senior year.

At Wisconsin Dr. King became a member of two life honorary scientific fraternities, Sigma Xi and Phi Sigma. He also joined the American Society of Animal Production.

It takes such men as Dr. King to demonstrate the fact that Clemson is one of the greatest Agricultural and Mechanical Institutions of this country. Such men show ambition, ability, stamina, and self-discipline that Clemson tries to foster within its men.

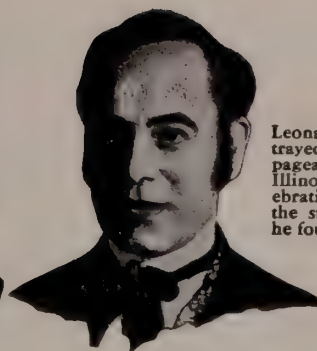
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A very effective way to reduce injury to peach and apple trees by borers is to "worm" them regularly in the spring and fall. This is accomplished by removing the soil from the crown of the trees to a depth of four or five inches and with a dull knife or other suitable instrument removing the worms from their burrows.



# YOUTH

## *Unlocks Earth's Treasure*



Leonard Andrus as portrayed in the Centennial pageant at Grand Detour, Illinois, in 1937, celebrating the centenary of the steel plow business he founded.



He was still in his twenties, this restless roamer from the East, when he arrived at Grand Detour and saw at last the site he had sought all the way from the Lower Lakes to the Gulf. Home and church, mill and store, all sprang up in answer to the vision and energy of young Leonard Andrus and those who followed to the settlement he started. They had staked all on the promise of the deep, black prairie land.

Despoiled of its virgin sod the soil went sullen in the second or third season, locked up its fabulous fertility by refusing to scour from wood and iron plows. Settlers started to leave their farms. Aided by another youth, a mechanic, Andrus began to make plows with moldboards of saw steel that would scour in the sticky soil. Youth found the key to Nature's treasure, founded a steel plow business which, as the Case Plow Division, celebrated its Centennial at Grand Detour in 1937. To men older, maybe wiser, the frontier was an obstacle. To youth it was opportunity.

## *Furrows Still Unfold Ways to New Wealth*

More substantial than mere words and monuments is the main memorial created by Case to honor Leonard Andrus. A hundred years ago his new plows tapped the treasure of an inland empire. Today the Case Centennial Tractor Plow creates new wealth from buried treasure, turns trash and cover crops into the soil to restore its riches and enhance its earnings.

Hybrid corn with mammoth stalks . . . inoculated legumes, old and new, rank-stemmed and tough-rooted . . . tall stubble and scattered straw from the combine—these are samples of the way America's agriculture advances toward new frontiers, finds new sources of wealth, new ways to conserve its soils. The Case Centennial Plow exemplifies the way American industry serves agriculture, furnishes machines to master its new problems. Hand in hand, method and machine are youth's weapons in a world of continual change.

Essential to all these advances on farm and in factory is the American principle of free enterprise. Not plodding peasants applying a formula prescribed by remote control, but practical men free to accept or reject admonition and advice, have pushed the progress of American farming to the topmost place in the world. Free enterprise encourages the best man, the best crop, the best machine to leap ahead, showing the way for all to follow and all to profit. In this heritage of freedom lies the hope and the opportunity of youth. J. I. Case Co., Racine, Wis.



CENTENNIAL JUBILEE IN 1942

In 1942 another youth, Jerome I. Case, began to furnish American agriculture with grain-saving machines. In 1942 the company he founded will celebrate its centennial with national ceremonies, historical pageantry, and educational exhibits. You are invited to witness these special events of the Case Centennial year. Look for local and regional announcements.

**Steel  
Plow  
Builders  
Since  
1837**



# CASE



**QUALITY FOOD FOR VIGOROUS HEALTH . .**

Continued from page 8

selection of the foods, were quite adequate, though low in cost.

McGinty—Speaking of food selection and food habits, I know that you have studied the diets of farm people in different sections of the state. Did you find any special differences in food habits in the different localities?

Moser—We did find a rather marked difference in the kinds of food used by families in the Piedmont as compared with the food used in the Coastal Plains area. In the Piedmont, typical farm diets had almost twice as much milk and half as much lean meat and fish as did low-country diets. There were other differences, with the result that Coastal Plains diets were often much lower in calcium and riboflavin than Piedmont diets.

Lease—There is reason to believe that the vegetables grown in the Coastal Plains may contain less iron than those produced in the Piedmont, with the result that there may be a great deficiency of iron in Coastal Plains diets than has been realized.

McGinty—Well, you folks are certainly strong for iron, and with the world situation the way it is, we need a lot of it in our systems. What about the vitamin content of these Piedmont and Coastal Plains diets?

Lease—The vitamin A and vitamin C content of diets in both sections was frequently too low, especially in late winter and early spring. Since vitamin C is not stored in the body to as great an extent as vitamin A, this seasonal vitamin C deficiency was especially serious. These deficiencies could be corrected by use of more greens, sweet potatoes, canned tomatoes, and fresh fruits.

McGinty—I hope our listeners who live in town will bear in mind that their diets as well as those of rural people are often deficient. They should try to make sure that they get the milk, fruits, vegetables, eggs, and lean meat necessary for a balanced diet. How much of these items is required in the diet, Miss Moser?

Moser—In Lee County the Bureau of Home Economics found that diets which prevented pellagra throughout the year included on the average 2 1-4 cups of milk, 3 ounces of fruit and succulent vegetables and about 3 ounces of lean meat per person daily. However, we know that people need larger quantities of these desirable foods than those mentioned if they are to enjoy positive good health.

McGinty—Well, many of our farmers are concerned that their pigs have a balanced ration and certainly we should use every effort to see that our children have one. Is there anything further you would like to say on this important subject, Miss Moser?

Moser—Good nutrition is not dependent entirely upon an adequate food intake, important as that is. Enough rest and sleep, balanced by enough of the right kind of exercise, absence of worry and fear, and other factors that would interfere with the nutritional processes going on in the body, proper care of physical defects that may hinder growth—all of these and more are involved in individual cases. But in the broadest sense an adequate food supply is the foundation of growth and development and of the maintenance of health.

**YOUNG PROVES SOUNDNESS OF USING PUREBRED COWS**

Continued from page 6

test as a junior 3-year old. She is a maternal sister of Milly Eminent Fern, mentioned above as the first of the qualifying daughter of the other silver medal bull.

Clara Oxford Lily, second highest silver medal producer, yielded 701.56 pounds of butterfat and 14,532 pounds of milk in 365 days, starting on test as a junior 4-year-old.

The youngest silver medal daughter completed her sire's qualification with a yield of 523.45 pounds of butterfat, 10,268 pounds of milk in 305 days. She is Fairy Pioneer Sophie, a maternal grand daughter of Milly's Goddington Noble, for her dam is the gold and silver medal winning daughter of this bull mentioned above, Milly Fairy.

Mr. Young's cow now holds a state age-class butterfat championship and 9 state age-class milk championships, exactly half of the possible championship places in S. C.

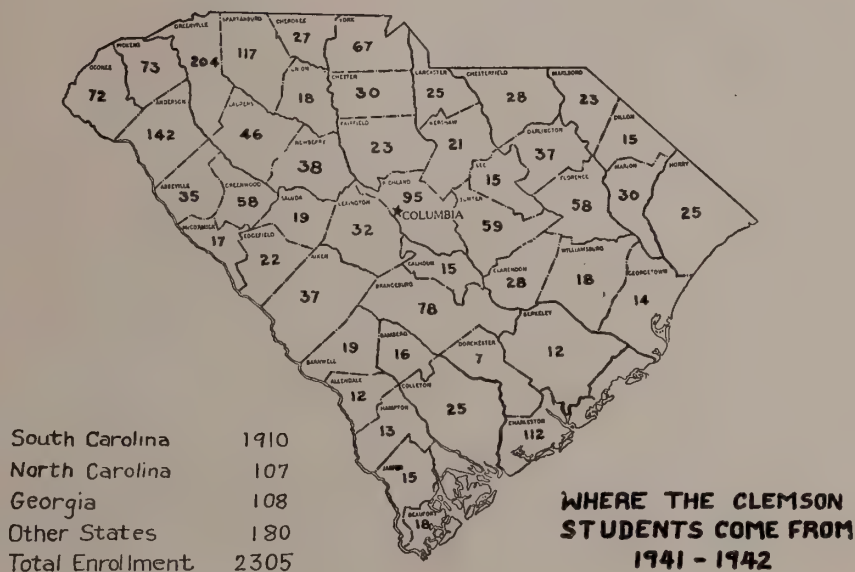
**QUALITY EGGS BRINGS HIGHER PRICES**

Continued from page 5

The poultryman who desires a reliable reputation, and who wishes to obtain the highest price must grade his eggs. The weight is extremely important in determining the price of eggs, for the food value is directly proportional to the weight.

An attractive package will contain eggs of the same size, shape, and color, for the appearance of the container of eggs has an important psychological effect upon the buyer.

# Where Clemson Students Come From



COMPLIMENTS OF

*L. C. Martin Drug Company*

**P. S. McCOLLUM, Owner**

**OFFICIAL COLLEGE BOOK AND SUPPLY STORE**

CLEMSON COLLEGE ★ SOUTH CAROLINA





# About This and That . . .

BY THE EDITORS



## OUR COVER

Seventy years ago, a son of Georgia, the renowned poet, Sidney Lanier wrote these lines in his "Centennial Ode."

"Long as thine art shall love true love,  
Long as thy science truth shall know,  
Long as thine eagle harms no dove,  
Long as thy law by law shall grow,  
Long as thy God is God above,  
Thy brother every man below,  
So long, dear land of all my love,  
Thy name shall shine, thy fame shall glow."

Touched as we are by the divine and patriotic spirit which emanates from these few lines, our eyes assume a different focus and our minds turn from stern material realities. We might well contemplate these eight brief lines of Sidney Lanier. Through them he sounds a philosophy for human relation and the continued progress of America. If we, the people of this nation so blessed, will pursue our daily efforts in the spirit of this message, we may look forward confidently to the day in which we will stand triumphant over mechanized barbarism.

—E. P. H.

## "ALMOST NATIVE"

According to an editorial in "The State" a South Carolina hostess in the course of a holiday dinner told her guests proudly that the rice that they liked so much was "almost native", because it came from Alabama. "Almost native", indeed! A friend had brought it as a contribution to the dinner, and also to show what is going on in Alabama where little farmers, according to reports, are adding rice to their home food crops.

To some of those present at the excellent dinner this "almost native" rice was "almost" humiliating. It should have been wholly native. South Carolina is the mother of rice culture. The crop left its native locality because of a combination of circumstances. Rice can be brought back to its native American locality, and to some small degree this being done.

It is estimated that the normal farm family in South Carolina spends from \$25 to \$40 a year for rice. It is also estimated that the normal family can produce its own rice on less than one acre of land; perhaps on one-third or one-half an acre.

That would be sensible farming, would it not? The saving of from \$25 to \$40 by the use of a few hours labor and a patch of land, is first class war-time farm policy. It is also first class peace-time policy.

—E. P. H.

## A NEW DAIRY QUEEN

More than six gallons of milk a day and more than three pounds of butter a day for 305 days, produced by Majestic Vanity, a South Carolina Jersey cow, establishes a new national production record for Jerseys.

Our new champion belongs to W. M. Swindler, Columbia dairyman, who purchased her from R. D. Smith, Kinards, S. C. and grew her on his dairy farm near Columbia. Majestic Vanity is South Carolina born and bred.

The official test, under direction of H. A. Johnston, (who is incidentally a former Dairy Editor of the Agrarian,) supervisor of testing work for the Dairy Department of the South Carolina Experiment Station, shows that "Majestic Dreaming Vanity 1209971," at the age of 3 years 10 months and 25 days, with her second calf, produced in the 305 days 16,140.6 pounds of milk and 817.96 pounds of butterfat.

In everyday language that means 1,876.8 gallons of milk and 1,022.8 pounds of butter, or an average of 6.15 gallons of milk and 3.25 pounds of butter a day.

This production, besides being a national record for Jersey Cows of her age, is a state record for all breeds in butterfat production for a three year old.

The record broken by this cow with the overpowering name had stood for 15 years. The Agrarian Salutes Mr. W. M. Swindler and Miss Vanity.

—E. P. H.





# A Secret of **SUCCESS**

To the Rescue

**MODERN FARM POWER...**

... Annually frees 910 million\* precious man-hours needed for greater food production, formerly required for "horse work." (Hours required to care for and to grow feed for the 7.6 million horses which the tractor has displaced.)

... Has released 33 million "horse feed" acres to produce food—enough for 16 million humans defending democracy.

\*Figures from U.S.D.A., Bureau of Agricultural Economics



New Model C—the tractor that needs no grease gun. One-plow economy. 2-row power.

Your nation is expecting you to raise the standards of American Agriculture to new heights. A big assignment, yes, but you can do it. You'll find a host of men already working toward this great objective. Men eager to *cooperate* with you. Therein lies the secret of American Agriculture's golden future.

Allis-Chalmers stands ready to work with you as you take over the reigns of leadership. By making available power equipment that gives the family-size farm the same production economies as the "big boys," A-C will help you to increase the income and happiness of your community. It is power equipment that encourages crop rotation, soil conservation and livestock farming. You will have help in building strong farm families . . . the back bone of our nation . . . because Allis-Chalmers machinery is designed for family farming.

## OPPORTUNITY TO BE A COMMUNITY LEADER

If you have not yet decided upon the exact way in which you can serve your community to best advantage . . . why not investigate the opportunities in becoming the Allis-Chalmers dealer? Besides the pride and satisfaction of operating your own business . . . you can become a community leader by showing your farm neighbors the way to better living, better farming and more profit—with power. Send the coupon below for details.

SEND THE COUPON



The outfit (Model B tractor and Model 40 All-Crop Harvester) that slashed harvesting costs on family-size farms. Saves at least 10c a bushel compared with the binder-thresher method.



The new Allis-Chalmers Corn Harvester—undermounted, safe, clear vision, light weight, on or off in 30 minutes.

YOUR "FURROW TO THE FUTURE" BEGINS HERE

Send the Coupon—

ALLIS-CHALMERS MANUFACTURING CO.  
Dept. 43, Tractor Division, Milwaukee, Wisconsin  
Gentlemen: Please send free catalogs checked to help me plan for the future.

☐ 1-Plow Tractor ☐ 2-Plow Tractor ☐ All-Crop Harvester  
☐ 2-Row Tractor ☐ Implements ☐ Corn Harvester

Name..... R.F.D.....

Town..... (PLEASE PRINT) State.....

☐ Check here if interested in information about becoming an Allis-Chalmers dealer.

**ALLIS-CHALMERS**  
TRACTOR DIVISION • MILWAUKEE • U. S. A.

*Shaping the Agriculture of Tomorrow*





## Food---A Weapon of War

By E. P. HUGUENIN, '42

When Secretary of Agriculture Claude R. Wickard announced farm production goals for 1942, calling for the greatest agricultural production in history, he pointed out the necessity for a common effort on the part of all farmers to destroy the barbaric forces that threaten civilization and to preserve freedom in the democracies.

"We've got to produce more of certain foods," the Secretary said, **"because food is going to win this war and write the peace."** Never before has the world been so hungry. Despite his victories, Hitler is desperate. Unless he can find food and oil in huge quantities, his conquest will become liabilities. There will be sabotage and revolt among the conquered peoples. And then, Hitler will lose, but hunger will be stalking Europe."

When that time comes," Secretary Wickard continues, "those hungry people must be fed, and we must do our part in feeding them. We must do it for humanitarian reasons. And we must do it for practical reasons too."

While calling attention to expected food needs after the war, Secretary Wickard emphasized the necessity of increased production to meet present requirements.

"We need to help feed England," he said, "because England has become our last line of defense". If England falls, we might as well get ready to fight Hitler in an open war, because he will not be satisfied so long as there is a mighty, free country left.

"Another reason why we need to increase production of meat, eggs, milk and canned vegetables is that there is an increased demand for foodstuffs in our own country. Factories are going full blast, and factory workers have more money to spend for food and they are spending it."

"I am confident the war will be won," the Secretary concluded, "And I know Southern farmers and the entire South will do whatever is necessary to crush the Nazi threat to democracy and civilization."

This was said before the Japrats started their attempt at national hari-kari by hurling themselves at the throat of the most powerful nation in the world. There is honor among thieves, so Hitler and his blatant stooge Mussolini also jumped from the frying pan into the fire. These moves are obviously moves that were





made to bolster up what remaining moral that the "Thieving Triumvirate" could salvage from defeats on the battle, economic, and political fronts.

America did not attack. America was asleep when the first blow struck. But America is now awake, fully aware of the fact that we can't afford to lose this war. And we won't lose it! There has never been found any substitute for food. Men don't have to **fight**! Men do have to **eat**! We of all the nations in the world have an almost inexhaustible food supply, a supply with which we can feed ourselves and our friends. Food is just as much a weapon in this war as a bullet, and the lack of it is far more deadly than the lack of a bullet can possibly be.

Let us lay aside our petty differences. Let us unite and administer to Japan, Germany, and Italy a defeat that they will never forget. A defeat that will impress upon their war-like elements that we are tired—very tired of unwise minorities in these countries, who saturated with self-conceit try to impose their obnoxious will upon free peoples. We have no intention of allowing this to happen again. If we stick together it won't happen again.

## PROTECT YOUR PEACH CROP

with

## PAN PEACH SPRAY

PAN contains all the necessary ingredients to assure maximum protection.

### SIMPLE TO USE

PAN is used at the rate of 8 pounds to 50 gallons of water and is put up in convenient units:—Cases of 4-8 lb. bags, cases of 2-16 lb. bags and cases of 4-16 lb. bags.

Leading peach growers throughout the country find **PAN PEACH SPRAY** the best answer to their spraying problems.

The J. W. Woolfolk, Ltd.

Manufacturers

Fort Valley

Georgia



## RESEARCH LEADS THE WAY TOWARD DIVERSIFIED AGRICULTURE IN SOUTH CAROLINA

continued from page three

Agricultural research in South Carolina has also been of value in overcoming the old prejudices in favor of expensive organic sources of nitrogen by showing that the important thing is to have nitrogen available at the time the plant needs it and not the source from which it comes. The station has also pointed out the advantages which would accrue to agriculture if fertilizers containing not less than 20 units of plant food were generally used. This would eliminate the filler which still finds its way into mixtures carrying only 16 units. Pasture studies have contributed much to potential livestock production which must inevitably be an important factor in any diversified system of agriculture.

These and many other phases of research are being continued by the experiment station in an effort to keep the agricultural industry of South Carolina abreast of the times and enable our farmers to meet successfully the rapidly changing conditions.

Cotton stalks should be cut and plowed under along with the leaves and burs. This is a recommended cultural practice in controlling the Cotton Flea Hopper and the Boll Weevil.

UNIFORMS

WILLIAM C. ROWLAND

MILITARY EQUIPMENT

## *The Anti-Infective Vitamin*

By C. A. JAMES, III

Since the beginning of this century, scientists have slaved in their laboratories in an effort to seek new information on vitamins. Many vitamin enthusiasts have written books on the subject. This article will briefly discuss vitamin A.

If vitamin A is deficient in the diet, the mucous membranes lose their power of secreting mucus. Infection with pus formation occurs in the eyes, ears, glands at the base of the tongue, and in the sinuses. The urinary tract, genital tract, lungs, respiratory tract, and the alimentary canal are other scenes of infection.

Mucus is a viscid, slippery secretion produced by the epithelial cells of the mucous membranes of the body. These membranes line the cavities in the body which are in some way associated with the exterior of the body, the mucus functioning as a protector of these membranes against infections.

The richest source of vitamin A is found in halibut-liver and Cod-liver oils. However, the foods found in a good diet contain liberal amounts of vitamin A. Among the vegetables spinach, kale, carrots, yellow sweet potatoes, green peas, string beans, and brussels sprouts contain varying amounts of this vitamin. Bananas, cantaloupes, tomatoes, and cherries are some of the fruits which have this vitamin as part of their composition. Egg yolk and dairy products are two extremely important sources of vitamin A in the diet. The cereals, nuts, and meats with the possible exception of liver have a low vitamin A content.

From the foods mentioned, it is shown that many of them have a yellow color. This color is due to an organic pigment, carotene. Carotene is the parent or precursor of vitamin A, for it is known that vitamin A can be synthesized from carotene. In vegetable foods the vitamin A present is in direct proportion to the pigmentation.

For those who wish protection against respiratory and other tract infections, a generous supply of vitamin A will prove to be a beneficial aid. Remember the proverb, "an ounce of prevention is worth a pound of cure."

# The FARMALL on Your Farm will NOT be Called for Military Service

THE handwriting is on the wall, plain for all to read. Young men working on the farm today may be off to camp tomorrow. Production of new farm machines to take their place will, in some degree, be limited by production of war machines.

But of this one thing you may be sure: *the Farmall tractors, at work on farms, won't be called away for military service!*

These great power-partners are available now, and they'll handle the big jobs on any farm for years to come. As each season rolls around, Farmall tractors will be *in there*

*working*—with greater efficiency than any other farm power. These tractors lead all others. They excel in handling all jobs from plowing, planting and cultivating to bringing in the harvest and teaming up with other machines on year-'round belt work.

That is why so many farmers are *buying Farmalls now*. They recognize in these tractors a constant source of aid and protection for themselves and their families. *With the strength of many men a new Farmall gives added security against any winds that blow.*

**INTERNATIONAL HARVESTER COMPANY**

180 North Michigan Avenue

Chicago, Illinois



## THE FARMALL FAMILY

**Power and Equipment for All Farm Needs**





**BUY U. S.**

**DEFENSE**

**BONDS**





# *The* **Agriarian**

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



Design's Lily, A Gold Medal Cow Owned by the Parrs'

**March, 1942**

**Clemson, S. C.**





## WHAT KIND OF WAR WEAPON IS THIS?

**You are looking at one of America's greatest weapons for Victory.**

**It isn't new, or secret, or revolutionary. It's an ordinary high-tension line insulator.**

But insulators are helping to bring dependable electric power to farms throughout America . . . helping the nation's farmers to produce the vital stores of *food* without which there can be no victory . . . *helping to win this war!*

In the difficult times ahead, electricity will shoulder more and more of agriculture's burden. When hired help is scarce, "wired help" will replace it. When increased farm production is essential, modern electrical equipment will step up farm efficiency. When work is harder, electricity will provide the hours of pleasure and relaxation that make hard work possible.

Wartime brings new problems to

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# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 4



No. 3

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# SOCIAL SCIENCES IN WAR

Guest Editorial — By D. R. Jenkins

"The sooner we are able to harness all our knowledge and skills, the social as well as the technical sciences, the sooner will our superior resources and manhood win the victory"

From our experience in the first World War we have a good idea of the jobs that can be assigned to the different sections of our population. However we are somewhat tardy to recognize the part that can be assigned to the sciences, particularly the social sciences.

We are well aware of the role that agriculture plays. The slogan "Food will win the war" is back again in currency, with something added. This time we hear that "Food will win the war and write the peace." From our past we also know how heavy industries and transportation contribute to the making of a war machine. This time the emphasis is on motors, rubber and alcohol instead of shells, mules and toluol. The general picture is the same, except that the war machine calls for parts in enormously greater number and variety than before.

The big difference between earlier wars and the present one is not so much the size of the industrial needs as the fact that war has become TOTAL. When Alexander hired some axemen and bowmen to set him up as world conqueror, war was a separate department from ordinary living. Again when Napoleon recruited horsemen and musketeers to conquer Europe, business went on as usual. However with each major war through history more and more of the nations' agencies and resources have come into the war picture, until now we have reached almost the limit of total war. The main conclusion that follows from "totalness is the need for a finely balanced coordination between the parts. Thus we have seen the teaming of tanks with planes (or ships with planes) by radio communication just as we have seen the teaming of diplomacy with war, and civilians with soldiers. Above all we have seen the teaming of science with action.

It is easy to perceive that there is a place on the team for the sciences that service agriculture and industry directly. However we have been a little slow to recognize the part that some other of the sciences can perform in the coordination of all resources for war. Many branches of science that contributed little or nothing in World War 1 now provide the key to successful operations. Meteorology is a good example. Both the vicious stab at Pearl Harbor and the sudden escape of German ships from Brest were made easier by rainstorms that should have been predictable. Meteorology is only one of many sciences that have come of age since World War 1, some of the other outstanding ones being loosely classified as social sciences. Economics, sociology, psychology, together with the branches of statistical methods developed for these

sciences have seen their greatest application in human affairs during the period between the wars. Civilization has become so complexed that the coordination of an economic system and the application of a program cannot be carried out solely by amateurs, however gifted.

One striking example out of many hundreds can be taken from what we now understand about the enemy's tactics. Several years ago some of us were inclined to scoff at the news that the Nazis were drafting the services of psychologists from their Universities. Looking back over the pattern of defeats that the Nazis have inflicted on the Democracies in the past four years, we can see that it was not all done with brawn. The German army was not invincible as we now know, but was helped to victories, some of them almost bloodless, by the cunning coordination of a "war of nerves" with the diplomacy of treachery and the disorganizing tactics of fascist "fifth columns." These activities were based on the use of propaganda techniques that the psychologists had worked out. It is terrible to realize that men of science used their knowledge of the human mind and its working to tell plausible lies and to sow chaos, nervous breakdown and despair. However, there are many aspects of total war that are even more terrible.

If there is anything we have learned from the experience of Britons under aerial bombardment, it is that bomb casualties are the least in importance. In Britain about one person in ten thousand has been killed by bombs since the war began. This would make about two casualties for a city the size of Anderson. The immediate problems of keeping daily life going are by far the most important, especially if the fighting morale of the civilians is to be sustained. Next follow the complex problems of defense migration and population dislocation, adjustment to new surroundings, community organization, housing and planning for re-built communities, and so on. This is mainly the field of the sociologist.

The place of the economist in war time is obvious. Foreign trade in relation to world politics, conservation of industries, rationing materials in such a way as to obtain the maximum yields, the control of price movements, financing war and the post-war reconstruction, all are in his field of work.

Further examples of the application of the sciences could be given almost indefinitely, but the point should be clear: The sooner we are able to harness all our knowledge and skills, the social as well as the technical sciences, the sooner will our superior resources and manhood win the victory.



# SWEET POTATO DISEASES

L. C. Hammond, '42

The sweet potato crop can easily rise from fifth in importance as a cash crop in South Carolina



COURTESY S. C. EXTENSION SERVICE

Carefully selected . . . disease-free sweet potatoes

The smooth, evenly colored, disease free potatoes, uniform sized which seem to catch the eye of the passerby perhaps at first wholly uninterested, are produced by the farmers who, not only know the fertility practices most favorable to high yields and quality production, but also have the knowledge conducive to the production of potatoes free from the ravage of disease. One has only to compare the appetizing appearance of such potatoes to the black spotted, shrunken potatoes of all sizes and shapes in a diseased lot to appreciate the loss in quality and marketing value caused by diseases not considering the much greater loss in quantity of produce. In the state of South Carolina, the sweet potato ranks fifth in importance as a cash crop. Even as a food crop, the product is used by the farmers through only a short season. "John, ya got any sweet potatoes?" "None, mine have all rotted. You know, I couldn't sell what potatoes I had, anyway. Didn't make many either." "Mine were the same way; had black rotten-looking spots all over them, and it weren't long before all of them were completely rotten".

Such is the case in many sections of the state where approximately thirty per cent of the sweet potatoes produced never reach the dinner tables of the farmer and their customers. In 1932, the Extension Service found that South Carolina produces twelve per cent of the potatoes east of the Mississippi and ships only two per cent. Diseases, largely controllable through proper crop rotation, selection,

handling and storage, are responsible to a great degree for this low export.

Through the work of the Extension Service this condition of exports is much better at present.

Let us, briefly, discuss some of the more important of these diseases, taking into consideration their symptoms, control and proper curing and storage methods.

Stem rot or wilt, Scurf, and Black Rot may be found in either the seed bed or the field, while soft rot and the last of the above mentioned group, Black rot, are most prevalent in the storage house. Stem rot, carried in and on the seed potato, in the old seed bed soil and in the field, may be easily identified in either the seed bed, where black streaks are found on the inside of the underground portion of the slip, or in the field where the leaves become yellowed between the veins, and somewhat puckered. Plants so diseased may die throughout the season or produce short sprouts from the stem end. The black rot organism, causing infection, is found on the potato, and other places, as just explained in the case of the wilt, and is also a storage house disease where it spreads the infection to healthy potatoes. A yellowing and sickly appearing foliage is seen in the seed bed and field. On the potato the presence of the disease is shown by the somewhat circular, depressed spots of varying size having a grayish black surface.

Infection by the scurf disease occurs in the same way as that of black rot, however, it can only be recognized on the potato in the form of brownish discolorations of the epidermis. The brownish spots which are only skin deep, tend to begin at the stem end of the potato and work downward until the entire surface is covered.

The skin may then crack and become tough and leathery, thus allowing the entrance of rot fungi. The actual food value of such a diseased potato is not greatly impaired, but the loss comes from reduced market value because of the unsightly appearance.

Soft rot results in considerable losses in curing and storage. The breadmold organism, always present in the air, enters only wounded potatoes, or those injured by freezing or too long exposure to the hot sun. The infected potatoes at first become watery and soft and later shrunken, hard and brittle. Not much spread occurs during storage as is the case with black rot.

Now, let us outline the practices necessary for the control of the above described diseases. First.

Continued on page 23

# EDUCATION WITH JERSEY INSURANCE

By C. B. Parr, '44

Correct handling of Jerseys can prove good Education Insurance

One problem that confronts our parents when we are growing up is how they can find the means to educate us. This is especially true of the parents who are dependent on a farm income. The wise father and mother start planning for their children's college education when they are small, for they realize only too well the limited amount of cash that can be set aside year by year for this purpose.

In 1929 my family consisted of my father and mother, three brothers and myself. I was the oldest, being six years-old, and my brothers were five, three and one, respectively. That was the year for me to start to school, and when Father and Mother began buying first-grade books, school clothes, etc., they realized that some plan must be devised to make possible the education of their boys, especially as we were so close together in age. Of course they considered the educational insurance policy, only to reject it because it would require too large a premium money to provide for four boys. As we had plenty of everything on the farm but money, my father decided to invest in four registered jersey heifers that could be raised on surplus feeds normally found on the farm. In due time he thought he could count on the offspring from these heifers to help educate his boys, and besides raising the animals would give the boys a worthwhile occupation and interest.

Our knowledge of the right kind of heifers was limited, so we considered Mr. T. F. Cooley, our county dairy specialist, and Mr. Dudley Steer, former Extension dairy specialist, about what and where to buy. Under their guidance, we purchased four granddaughters of "You'll Do Volunteer" and "Raleigh Farmer's Glory" for \$300.00. One of these was a yearling for which we paid \$150.00. The other three cost \$30.00 each. The Yearling heifer was a nice looking animal, and I immediately claimed her, while my brothers took possession of the other three calves, an unattractive looking bunch—unfed, louse-eaten and wooly. I can well remember my grandfather teasing my brothers about those wooly calves. We had confidence in the judgement of Mr. Cooley and Mr. Steer, so we went to work with a will on the calves, clipping all their hair off and greasing them with oil to get rid of the lice.

When we started with our calves, we had only a three-acre pasture and the mule lot. The calves got along fine running in the mule stables behind ten mules and eating bundle oats that we fed them twice a day. Our calves were bought in April, and when fall came, they were ready for the State Fair. However we did not know how to fit them. A local livery stable man came to our rescue with the prop-

osition that he would help us fit and show the heifers for half of their winnings. To this we readily agreed. Every calf won a ribbon; my heifer was first in her class, and also Junior-Champion. This heifer won about \$75.00, while the other three won about \$15.00 each. I believe that it was our experience at the fair that really sold us on dairy cows.

When the heifers were two-years-old, they dropped calves sired by "Brampton Triumph Standard," the Wheeler Brother's bull. The two oldest dropping heifers, and the two youngest dropping bulls. The first heifer from my cow has never had a bull calf, but has had eight heifers. The two oldest heifers now have forty three descendants in our herd.

We bought half interest in a son of Imported Forward out of the highest testing daughter of "Fly Sultan." This bull has made a silver medal in spite of inexperienced handling of his daughters.

That was our start, and all went well until we raised and bought with our fair money too many calves for the land available. Then too, we had not learned much about feeding. There was not enough surplus feed left from feeding the mules, nor did we have enough hay and grain for the cows, as ours was still a cotton farm. Our calves began to die from stomach worms, and our yearlings did not grow out. We sold all but what we could adequately feed. However, we did not sell those undergrown cows with registration papers.

Until 1935 we had been selling cream, and Grade "B" milk. At that time my father began getting away from cotton, and he put in a few cows with ours. He had fenced in fifty acres of only fair pasture land. A dairy barn had been built the year before, and we had separated our cows and our mules. We also realized that our calves must be separated from the cows. Since 1936 our calf mortality rate has been as low as I believe it is possible to attain on a farm. We have lost only one heifer since then. We feed milk from the cows for only four weeks, and during that time we feed the milk from a pail that has a nipple. This one factor has been of great benefit in the rearing of healthy calves.

In 1936 the daughters of our "Forward" bull were ready to breed, so we purchased a son of "Observer King Onyx" out of a Gold Medal daughter of "Lawnbridge Beauty Volunteer."

In 1937 we fenced in more worn-out farm land for pasture, and by using lime with phosphate this is now becoming a first rate pasture. When we started, we had only 3 acres of poor pasture; now 125 acres.

Continued on page 23



# Horticultural Products Laboratory

By T. W. Gwin, '43

The fact that California can sell canned peaches at a profit after shipping them across the continent should, in view of the experiment last season, encourage the development of a canning industry here.



COURTESY S. C. EXTENSION SERVICE

Surplus productions from orchards like these can be utilized to the best of advantage by sensible canning program.

In 1940 the State Legislature, at the request of the peach growers of Spartanburg County, appropriated money for the establishment of a Horticultural Products Research Laboratory at Clemson College. In the spring of 1941 the laboratory was located and built adjoining the Horticultural Greenhouses just at the edge of the campus.

The research laboratory was started for the purpose of determining the best methods of canning South Carolina fruits and vegetables. The laboratory is under the administration of Prof. A. M. Musser, Head of the Horticultural Department, and the processing is supervised by Prof. L. O. Van Blaricom, Assistant in Horticultural Manufacturers, who received his training at Oregon State College. The first experimental work was conducted with peaches because of the extremely large acreage of this crop in this state as well as in North Carolina and Georgia. This work began in the summer of 1941. About 1400 cases of peach preserves, whole peaches, spiced peaches, peach halves, and peach butter were canned during this period. About 900 cases were in No. 2 1-2 cans and around 500 cases were in No. 10 cans. Of the thirty-six varieties canned, fourteen made an excellent canned product. A selection of four to six of these can be made for a particular locality and will provide the raw material for canning over a period of two to two and one-half months.

The chief object the past season was to show that South Carolina can grow a number of varieties of

peaches that will produce good crops of high quality fruit that will make an excellent canned product. The Horticultural Department has in its experimental orchards thirteen new seedlings which ripen before the Golden Jubilee variety, the earliest of the good canning varieties. These are all highly colored, good quality peaches and from them one or two more varieties can be obtained to further lengthen the canning season.

Formerly, it was believed that eastern freestone peaches would not make a good canned product. However, critics failed to take into consideration the fact that each year thousands of housewives can freestone peaches in The Southeast. Since it was commonly believed that freestone peaches could not be successfully canned on a commercial scale, it was necessary to convince canners, wholesale and retail grocers, and consumers that they could be made into a good canned product. One cannery in New York State has been canning freestone peaches for years and sells this product on quality alone and the experiments at Clemson have shown that a canned product of high quality and good appearance can be made from southeastern peaches.

It is more difficult to handle freestone peaches during the canning process than clingstone varieties, but many of the freestone varieties have so much better flavor than most of the clingstone varieties that it is well worthwhile to use the extra care required in handling the freestone varieties during the canning process. One of the reasons why most of the varieties that were canned at Clemson the past season made such a good product was the fact that the fruit was ripened before being canned. All of the peaches were picked one or two days before they would have begun to soften on the tree. They were then placed in storage rooms having temperatures of 35, 55, and 65 degrees F. At all three of these temperatures (lower than outside air) the peaches colored and ripened uniformly. Naturally ripening proceeded at a more rapid rate at 65 degrees F. temperature than one as low as 35 degrees F. which is a point in favor of the higher temperature. This method of ripening together with the method of peeling used is believed to account largely for the excellent quality of the canned product. At the high air temperatures prevailing at peach harvest most varieties do not ripen or color uniformly on the tree until they have become too soft to handle. If, on the other hand, the peaches are picked while firm

Continued on page 19



# THE PROBLEM OF FOOD PRODUCTION

By C. B. Fellers, '43

Goals that have been set will be difficult to reach but the farmer can do it despite war time shortages.



COURTESY S. C. EXPERIMENT STATION

The farmer can ill-spare labor.

Farmers are being called upon for the greatest food production in our history. "The new 1942 goals, Secretary Wickard said, "call for putting every acre of land, every hour of labor, and every bit of farm machinery, fertilizer, and other supplies to the use which will best serve the nation's wartime needs." The converting of our farms on a war time basis have brought about many difficult and serious problems.

The principal problem is one of labor. The migration of good farm labor to the factories has been on the increase for some time. until now the drain is becoming not only serious but devastating. The farmer is unable to compete for labor with the roaring factories from one end of the country to the other under his own economic situation and the prices he receives from his produce.

Supply and demand will probably make it possible for the farmer to attain "parity" in the sale of his goods in the nation's market, and it appears to be freely conceded that such prices would only be fair and just and not inflationary. Parity is a price designed to give farm products the purchasing power they had in some past period, usually 1909-14. Since the prime object is to get the production, policy will be to put prices high enough to induce farmers to produce what's needed.

The cost of living has advanced 25% in the last year. Despite attempts of the food processors to blame higher prices on the farmers, the fact of the matter is that farm prices ended the year 1941 at only 92% of parity. Rising prices will also mean

rising costs, and need for acute management to watch profit margins. The purpose of the price ceilings is to keep the rises in line.

The chief concern of the farmer is that there be no price collapses such as occurred at the end of the other war. Unfortunately, the price control bill does not offer any protection against postwar drops.

The curb on tire sales makes it hard for the farmer to secure tires for the operation of his farm tractors and farm implements. At the same time quotas have been set by OPM for manufacture of farm machinery and equipment. These obstacles are arising at the very moment farmers are being asked to increase production. All of this adds up to the necessity of adopting a course for making the best of the situation. That appears to be what the government has already recommended and planned for: getting more and longer service out of tractors and machines now on the farms by having this equipment overhauled and maintained for maximum efficiency.

Some of the goals that have been set will be difficult to reach, but the farmer can do it despite war time shortages of farm labor, machinery, fertilizer, and production supplies.

Without food and fiber, our ships, planes and cannons are "as sounding brass or a tinkling cymbal."

—THE AGRARIAN—

## Farmers Challenge

Farmers are challenged by the present emergency. That is in the matter of waste. It is questionable whether the country could afford at any time the prodigality which for so long characterized our use of its God-given resources. Now, of course, we realize that a small size democracy could have grown fat on the food which we literally threw away, to say nothing of the other crimes we committed in the name of "individual freedom." Now, perhaps, we shall become a thrifty people and if so, who shall say that all was a loss?

Finally, when once again the world regains its senses, when the "blue birds" return not only to the "cliffs of Dover," but to the caves of Corregidor, the hills of Chunking, and the Straits of Macassar (yes, even to the ruins of Europe) let it be the proud boast of the American farmer that in the hour of the world's need, he had the intelligence to plan, the fortitude to produce, and the wisdom to conserve.



# DAIRYING AND THE SOUTH'S FUTURE

By E. B. Collins, '43

In solving the future of the South, dairying is bound to play an important part.



COURTESY S. C. EXTENSION SERVICE

Temperate climate, fertile soils, abundant rainfall, and a long growing season . . . all make for more herds such as these. Where are they?

In the early Colonial days, the Carolinas were considered two of the greatest cattle states in America. Today they rank among the lowest ten states of the Union in numbers of dairy cattle. Why has our southern Agricultural system been so different from the early predictions? Nature has brought together in the Southland temperate climate, fertile soils, abundant rainfall, and a long growing season. What more could the early pioneers have asked as free gifts of Nature? These characteristics make the South one of the greatest potential agricultural sections in the world.

While our Southland has great possibilities as a cattle section, certain other enterprises such as cotton and corn, relish the same requirements for growth as do pasture grasses. Consequently, cotton has taken the lead, and today the southern people are feeling the effects of a one-crop system of farming. Our attention must be turned toward the importance of soil fertility. Thomas Green Clemson, one of the greatest early American farmers, whose bequest made possible the founding of the Clemson Agricultural College, and whose efforts were influential in the founding of the Maryland Agricultural College, was a great advocate of the maintenance of soil fertility.

It is agreed upon that one of the easiest and most efficient methods of maintaining soil fertility is the application of farm manure. This is one of the benefits to be obtained from livestock. Improved pastures and dairy cattle can be made to aid greatly in overcoming the disastrous one-crop system of farming used by many southern communities. Pas-

ture grasses in South Carolina should furnish at least fifty percent of the feed for dairy cattle. At present, pasturage supplies only twenty percent. With the development of pastures and livestock in connection with other types of farming, self-sustaining farms and contented rural life can be put on a more solid foundation.

The Dairying industry has now one of the greatest opportunities in history for growth. During peacetime, America neither exported nor imported very large amounts of dairy products. A little foreign cheese made up practically all of the imports. Today England is asking for enormous amounts of skim milk, evaporated milk, and cheese. At the same time the American people are asking for more milk and other dairy products than has ever been asked for in the history of our country.

It is true that the continuity of these demands, should war be suddenly stopped, is a matter of speculation. Amazingly large numbers of dairy cattle are being slain for beef continually in Europe. Since dairying is a long time enterprise, these cattle can not be suddenly replaced when peace is declared. The consumption of milk per capita in the United States is much below that demanded by milk's qualities as a food. The requests of England, the butchering of cattle by Germany, and the increased demands in America have only hastened the trend in milk demands which was sure to come. It is true that there will be a decrease in the demands for dairy products at the close of the war, but it is also evident that dairying in the South will never again return to the same level as pre-war times.

# Horse and Mule Production as a Vital Factor in National Defense

By D. C. Eaddy, Jr., '45

The small farmer is a pillar of the nation . . . and without his mule he would be absolutely helpless. . . .



COURTESY S. C. EXTENSION SERVICE

South Carolina farmers are cutting heavy annual expenditures for workstock by growing their own mules and horses.

According to latest available statistics furnished by the Department of Agriculture, there are approximately 4,000,000 mules in the United States with an average value of \$114.53 each and 1,000,000 horses with an average of \$77.45. Since the National situation has become so acute, the sale of machinery and even fuel to a certain extent, has been sharply curtailed. The small farmer is the backbone of our Nation; the produce of his farm is a vital necessity in the situation which we face, and his method of production is a matter of acute concern to our leaders in the war of production. The mule is the main field power in the Southland. They furnish comparatively cheap power and withstand heat better than horses. Further North, where the climate is somewhat cooler, horses are the main source of power. According to the Illinois Experiment Station, "Horse and tractor farms have about the same total costs for labor and power. In a survey lasting for ten years on 57 farms, there was a marked difference in amounts paid out in cash during the period. On farms operated exclusively with horses, an average of only \$1,190 per farm was spent for horses and machinery, whereas on farms using tractors, an average of \$2,850 was spent per farm for equipment. The difference in total cash outlay thus amounted to \$1,160 per farm in ten years." A factor well worth remembering is that tractor fuel cannot be produced on the farm. where 20 bushels of corn, 30 bushels of oats, 1 1-2

tons of hay, plus pasture will keep the average mule or horse in excellent condition.

Mules may be classified as draft mules, farm mules, sugar mules, cotton mules, and mining mules, the farm mule being the more prominent in the South. Many mules find their way into United States Army service, where in spite of our mechanized equipment, they play an important role in carrying supplies through areas unaccessible to machinery. After the war is over, machinery may be more popular than ever, but the mule and horse will never totally disappear from our farms. Many small farmers will use the dependable cheap power of the horse and mule to attain the "Free and independent life" which only a self supporting farmer can live.

—THE AGRARIAN—

## Sugarcane Syrup in Laurens

County Agent C. B. Cannon reports a demonstration on the farm of Furman Finch. Owings, which showed the production of 129 gallons of sugarcane syrup from three-tenths of an acre. The cost was \$45.73, and his syrup is valued at \$129. "Mr. Finch's success in this project was due to planting his sugarcane near a small stream and using gravity irrigation", says Mr. Cannon. "This was the first time Mr. Finch has grown sugarcane. He conducted this demonstration because he had seen one of his next-door neighbors growing sugarcane through the cooperation of the county agent."





# COTTON CROP INSURANCE

Cotton crop insurance is protection against loss from unavoidable hazards in that the insured grower will be paid in cotton all the cash equivalent price per pound for that part of his crop loss covered by insurance

## EDITOR'S NOTE

Farmers have been allowed to insure their home and car . . . And now he can insure his cotton against unavoidable hazards. These include drought, insects, plant disease, flood, wind, storm, hail, frost, fire.

Sam—Things look mighty bad, Bob.

Williams—Well, they do. The Japs have taken Singapore and gotten hold of some of the oil wells and nobody knows whats going to happen to the Burma Road and the Dutch East Indies.

Sam—If those Russians can just stop the Germans this spring everything will be all right.

Williams—But do you suppose the Germans will really attack Russia this spring. They may go below Russia, try to take India, and join forces with the Japs. They went into Russia to get oil and now that the Japs have control of some oil fields, all Mr. Hitler has to do is cross the southern part of Asia and get the oil.

Sam—Now, Bob, that ain't like you—lookin' on the dark side of things. They can't do that without takin' a lot o' men and then look out—Russia'll move in on Germany. Them Russians done said they're goin' to Berlin and they ain't had no cause to change their minds.

Williams—Sam, that's about as cheerful thng as I've heard lately. If Germany does move too many of her troops out, it will leave the home defense weakened and that will be the time for the Allies to strike them their most vulnerable spot.

Sam—I don't know as I follow you, Bob, but I shore would like to work my way to Berlin with the army.

Williams—We're both a little to old to be called, Sam. We'll have to do our part right here on the farm.

Sam—Yep, I reckon so—but I shor would like a crack at one o' them Germans er Japanese.

Williams—So would I. But I tell you, Sam, if it weren't for the older men like us raising food stuff and growing cotton and things—the soldiers and industrial workers 'ud have to quit tomorrow. Yes sir, we've got our part to do in winning this war and it's not a small part either.

Sam—Talkin' about cotton, Bob. Are you going to plant much cotton this year?

Williams—Sure am—as much as the law allows. We need cotton as badly as almost any other war commodity, Sam.

Sam—Well, I guess it's the patriotic thing to do, but I'm a little dubious about planting cotton

this year. You know I went in the hole with cotton crop last year.

Williams—But Sam—

Sam—And old man Johnson down the road there just plowed his cotton crop under rather than go to the expense of picking it. It was so poor.

Williams—Yes, but—

Sam—You know yourself, Bob, farmers lost money on cotton last year with the boll weevil and all—it was the shortest crop the nation'd had in years and years. I know you're going to say we got to take a risk on account of the war if nothing else. Goodness knows farmers'er used to takng risks on their crops and I guess it's not so bad for a farmer with as much land as you've got—but for a small farmer like me it's going to go pretty hard. No sir—I may plant cotton—probably will—but I know that I'm taking a risk.

Williams—Haven't you heard about cotton crop insurance, Sam?

Sam—Cotton crop insurance—?

Williams—Sure—it's being offered to cotton growers for the first time this year by the Federal Crop Insurance Corporation, handled by the AAA.

Sam—You say, cotton growers can insure their cotton crop?

Williams—That's what I said.

Sam—Well, now, that's what I call a good business proposition.

Williams—Certainly. Insurance is an important part of any business. Ocean liners carry insured cargo—Most buildings and warehouses are insured against fire and damage of all kinds. And I have insurance on my car.

Sam—Why sure—you don't want to take chances on it being stolen or wrecked.

Williams—Well, Sam, don't you think it's about time the idea of insurance was used on one of the world's largest, and sometimes, riskiest businesses—farming.

Sam—Never had given it a though, but I reckon you're right. Tell me more about it.

Williams—The crop insurance idea has been used very successfully by wheat growers up in the Great Plains. This year—for the first time—cotton growers will be able to insure their crop.

Sam—This crop insurance—didn't you say it's being offered by the Department of Agriculture.

Williams—That's right. And the Federal Crop Insurance Corporation, I mentioned, has around 100 million dollars of capital stock—which means that

it's in position to take care of all crop loss claims.

Sam—Well, Bob, how does this insurance work?

Williams—It's like this, Sam. Folks who insure their crops have to pay a premium—just as they pay premiums on any other kind of insurance policy. But in the case of cotton crop insurance the premium is paid in the form of cotton, or the money that would buy that amount of cotton. Then, when crop losses occur, the losses are figured in terms of cotton, although actual payment is usually made in cash.

Sam—Then, as I get it—all cotton growers who take our crop insurance “kick in” small amounts of their crop in order to be insured. Then those who lose their crops—from some other cause than just plain laziness—are given a certain amount of this cotton that's been collected from other farmers.

Williams—That's it, Sam.

Sam—But suppose the cotton crop is short again this year—and the premiums collected from the farmers won't cover the losses of those insured?

Williams—There you go, Sam—on the dark side again.

Sam—Well, I just wanted to know.

Williams—I've got the answer for you right here. The Corporation has 100 million dollars, just in case the government has to pay out more losses than the premiums it takes in.

Sam—Well, that ought to cover it all right.

Williams—You see, Sam, with this cotton crop insurance folks can grow cotton and be sure of a crop. This crop insurance practically removes the hazard of crop failure.

Sam—Bob, where can we get this cotton crop insurance?

Williams—At any AAA office. And, by the way, the AAA office can tell you all the details of the insurance plan. I don't claim to know all about it—I can just give you a general idea.

Sam—Do you know what kind of loss this crop insurance covers?

Williams—It takes care of all unavoidable losses, Sam. Losses that result from drought, weevil attacks, diseases, floods, wind, or storms of any kind—even frost or fire.

Sam—Sounds like they've covered the bill.

Williams—They've just about covered everything except loss from laziness or plain cussedness—as you said awhile ago. That's the reason it's called an all-risk crop insurance.

Sam—Well now, Bob, suppose a fellow got hold of a poor batch of seed or maybe some one stole his picked cotton—would the Insurance Corporation make adjustments on losses like those?

Williams—I'm afraid not. Losses like those would be considered avoidable—very definitely and wouldn't be covered by the insurance. Of course, when the Department of Agriculture insures a per-

son's cotton crop, it does so assuming that the grower will do all he can to protect his crop from damage.

Sam—That's fair and square. Here's another thing, Bob, does the Crop Insurance cover the full value of the cotton crop?

Williams—Not the full value. The insurance covers either 50 or 75 per cent of the average yield. If a grower takes out 75 per cent insurance, his premiums will be a little greater than if he took out 50 per cent coverage—but in any case the premiums are small. They have to be used to pay crop losses. Premiums do not go toward operating the insurance system.

Sam—Well, I guess mighty few insurances offer 100 per cent coverage. Suppose a fellow wanted to try it out—could he insure just a part of his crop?

Williams—Sam, the Department of Agriculture says that if a grower decides to take out crop insurance, he must insure all of his crop that he has planted in that particular county. All or none. But if the same grower happened to have a planting of cotton in a neighboring county he wouldn't have to insure that part of his crop.

Sam—I know a few fellows who rent their place, and I'm not sure that in every case the landlord would care to be in on this idea of crop insurance. How about a case like that, Bob?

Williams—That's no problem. Any person—landlord, tenant, or sharecropper—can insure his share of a crop. It isn't necessary for the other fellow to insure his part—get the idea?

Sam—I guess so. Sounds like a pretty good system—never heard of anything like it. By the way, Bob, how soon does the insurance go into effect?

Williams—Just as soon as the crop is planted and the grower signs his application. And the insurance remains in effect until January 21, 1943—that's into next year. Then, if for any reasons the insurance should be extended a few weeks, arrangements should be made with the AAA office.

Sam—Well, Bob, I still don't see exactly how a fellow pays his premium.

Williams—Let's see. I said he paid a certain amount of cotton to the Government.

Sam—That's right.

Williams—As a matter of fact, a grower may pay his premium either in cotton or in cash—or if the money of the cotton isn't handy, the grower can sign a commodity note, which is simply an agreement to pay the Crop Insurance Corporation the amount of the premiums in cash or with an equal value of cotton. These commodity notes will be due about picking time when there's plenty of cotton on hand.

Sam—In case of a crop failure what happens?

Williams—The grower gets paid for his loss as soon as the loss occurs. First of all an adjuster comes around. He and the farmer determine the

Continued on page 14





# BETWEEN THE

## MARKETING CONFERENCE

A conference was held here at Clemson on marketing South Carolina farm products the week-end of March 6-7. About 250 officials of various agricultural agencies, farm leaders including officers and directors of all types of farm cooperatives, and representatives of purchasing agencies, railroads, fertilizer interests, and other business firms were present for the two-day meet. Talks and discussions featured the problems associated with marketing the principal farm products in South Carolina, particularly livestock, poultry and eggs, fruits and vegetables, seeds, grains, feeds, and miscellaneous products. Director D. W. Watkins of the extension service presided over the sessions.

—THE AGRARIAN—

## ALPHA ZETA ACTIVE

The Alpha Zeta Fraternity enjoyed a discussion program on the subject "Courtship and Marriage" led by Dr. O. W. Warmingham, recently. During Religious Emphasis Week, the Fraternity met jointly with the Dairy Club for a period with one of the "trouble shooters". Work has begun on the tabulation of the answers received from all alumni members, and it is hoped that the completed alumni news letter will be in the mail by the end of the month.

—THE AGRARIAN—

## AG. FAIR DISCONTINUED

The Agricultural Fair has temporarily been discontinued until after the present emergency. The Ag. Fair Committee composed of T. E. Garrison, chairman, W. M. Hobson, and L. A. Williams met with the faculty advisors, and after carefully considerations of all the shortages due to this all-out war effort decided to abandon the Ag. Fair plans until after the war clouds have vanished. The Ag. Fair committee wishes to extend their regrets of the abandonment of the fair to the previous committee that staged such a successful fair last year.

—THE AGRARIAN—

## RAISE MORE HONEY SHORTAGE OF SUGAR

Calling on every beekeeper in South Carolina to make every possible effort to raise more honey this year, Ned Prevost, bee specialist of the Clemson College Extension Service says:

"We must help in this wartime to raise some if not all of our sweets." Pointing out that our heaviest

honey flow comes early in the spring and that in most conditions the bees are not at the proper strength to gather this early honey flow, Prevost advises every beekeeper to get his bees in right condition to gather the poplar flow, which is a very heavy flow.

—THE AGRARIAN—

## CLEMSON CANNED PEACHES ON EXHIBITS

In appreciation of the appropriation the general assembly allotted to the building of the cannery of Clemson, the horticulture department gave the legislature a sampling of some of their canned peaches. The peaches were served to the legislative branch of the state government in paper plates with saltine crackers for sampling. Each member of the general assembly was given a two pound jar of preserves with the Clemson colors of purple and gold on the labels of the cans.

—THE AGRARIAN—

## NEW COURSE

There has been a new course added to the curriculum of agricultural students entitled, "Commercial Canning and Food Preservation". Mr. L. O. van Blair-com, in charge of the new horticulture cannery, is teaching the course. The new course consists of two lectures and one laboratory a week. During the laboratory, the students actually carry out the canning and freezing processes.

—THE AGRARIAN—

## SWEET POTATOES NOW BLOOMING

For the past three years, the horticulture department has been carrying on a sweet potato breeding program. In order to produce new varieties from true seeds, flowering and seed production must take place. Under field condition popular varieties of sweet potatoes do not produce flowers. The potato plants that are being used in this breeding program in the greenhouse have already started blooming.

—THE AGRARIAN—

## EXPERIMENT WITH SWEET POTATOES

Dr. J. B. Edmund, associate horticulturist of the S. C. experiment station, and Mr. G. H. Dunkelberg, associate agricultural engineer, are working with electricity as a source of energy for sweet potatoes. They are planning to publish a bulletin on their experiment after this season.



# FURROWS

## PEANUTS FOR VICTORY

"Peanuts For Victory", is the title of a circular recently published by H. A. Woodle, Extension agronomist, through the Extension Service. Fats and oils are important materials in our present war economy. Our farmers must greatly increase their production of these essential supplies which have been depleted by reduced imports due to war conditions. The Farm War Program calls for South Carolina farmers to increase their production of peanuts by 350 percent in 1942. This means an increase from 20,000 acres in 1941 to 90,000 acres in 1942. By increasing the production of peanuts for oil, farmers can contribute materially to the national war effort, and at the same time they can benefit personally by the additional cash income.

—THE AGRARIAN—

## SPEAKER

Dr. G. H. Aull, head of the department of agricultural economics and rural sociology, recently spoke to the Western South Carolina Torch Club in Greenville on the subject "Some Economic and Social needs of S. C." W. S. C. T. C. is an organization composed of educators and professional workers in the western part of South Carolina. The membership is largely made from men of Clemson, Greenville, Spartanburg, Clinton, and Anderson.

—THE AGRARIAN—

## Dr. Cooper Attended AAA Meeting at Capital

Dr. H. P. Cooper, dean of the school of agriculture, attended a meeting of the Southern Agricultural Deans and Directors at Washington, D. C. This meeting was called by the Agricultural Adjustment Administration for the purpose of securing coordination of the AAA and Agricultural Colleges and Experiment Station.

—THE AGRARIAN—

## THESIS WORK

The Agronomy Department reports that 32 seniors are now engaged in elementary research and are making a very promising showing in their work. This would lead one to believe there is a distinct place for a graduate school at Clemson in agriculture.

## ADJUSTMENTS NEED TO BE MADE—Dr. Collings.

Dr. G. H. Collings, professor of soils, says, "that something is wrong when an acre of good land sells for \$10 and costs the government \$200 to have it cleared for an army base, as is reported to be the case in Blackstone, Virginia, Camp Area.

—THE AGRARIAN—

## NEW PROFESSOR

Dr. H. T. Polk, associate agronomist of the experiment station, has replaced J. W. Jones as an instructor in the soils laboratory. Mr. Jones left after the first semester to report for duty at Fort McClellan, Anniston, Alabama.

—THE AGRARIAN—

## EXTENSION SERVICE MEN TO ARMY

Recently, the extension service lost three of its staff members to the army. They were: G. H. Stewart, assistant agricultural engineer, W. L. Abernathy, Jr., supervisor test demonstration farms, and M. C. McKenzie, assistant agricultural engineer.

—THE AGRARIAN—

## S P R I N G

A pair of tiny woolly lambs  
Peep shyly from the dale.  
A bluebird shrills his aria  
That shames the nightingale.  
A tiny, green-tipped tulip,  
A shiny sprig of grass,  
Proclaim to all that winter's gone  
And "Spring is here at last!

—THE AGRARIAN—

Fine bonded writing papers can now be made from such cotton by-products as hull shavings and waste from ginning, carding and other cotton cleaning operations, through a commercial chemical, sodium chlorite, according to a paper manufacturer of Dalton, Massachusetts.

—THE AGRARIAN—

Mint—used as a flavor for toothpaste, gum and medicine is grown commercially on 1,742 farms in the United States—nearly all in southern Michigan and northern Indiana.





## COTTON CROP INSURANCE

Continued from page 11

extent of the loss—50 per cent or 25 per cent, or whatever the loss happens to be. Then payment is made on the basis of that assessment.

Sam—Well, this cotton crop insurance doesn't sound half bad.

Williams—It certainly will mean a lot to us here in the Cotton Belt. You see, Sam, crop insurance protects a farmer from losing his crop from all unavoidable hazards—

Sam (CUTTING IN)—such as weevils, drought, flood, storm, and disease—I get the idea—

Williams—and it guarantees a grower a fixed cotton yield every year.

Sam—That ought to mean a steady income that will come in mighty handy for farm expenses, taxes, and house expenses.

Williams—Sam, the insurance makes it profitable for a person to build up the soil whether he owns or rents—there're hundreds of reasons why cotton crop insurance is valuable to folks in the South.

Sam—You're really sold on it, eh Bob?

Williams—Believe I am, Sam, believe I am.

Sam—Just one more thing. How soon do insurance applications have to be in at the AAA office?

Williams—Glad you asked that question—that's important. The insurance applications must be made before the planting starts. The actual final date varies for different sections of the Belt. In most places the deadline is sometime in March—We'll have to check with the AAA office for specific information.

Sam—Well, that crop insurance sounds like a good thing, all right.

Williams—Personally, I think every farmer should insure his cotton crop. Almost every cotton farmer has had crop failures sometime during his farming operations. And, as far as I can see, this cotton crop insurance is the only way a grower can guarantee himself and his family that he'll have cotton to sell. There just isn't any other way to protect against crop failures except by crop insurance. Of course, we aren't looking for crop failure this year, but it comes once in a while.

Sam—That's right, we need to be prepared.

### THE ANIMAL HUSBANDRY DEPARTMENT of CLEMSON COLLEGE

Purebred

Berkshire Swine  
Polled Hereford Cattle  
Hampshire and Southdown Sheep

INSTEAD OF REPLANTING  
**COTTONSEED—  
TREAT IT WITH  
CERESAN!**

There's everything to gain—and nothing to lose—when you plant CERESAN - treated cottonseed! Ceresan generally reduces seed rotting, sore-shin, certain other seed-borne diseases; commonly gives stronger, more uniform stands at a saving in seed; usually increases yields, often as much as 10 to 25%. Inexpensive, easy to use. When you buy seed, look for the Ceresan Treatment Tag. Ask dealer for free Cotton Pamphlet or write Bayer-Semesan Co., Wilmington, Del.



the original organic mercury  
**SEED DISINFECTANTS**  
A TREATMENT FOR EVERY MAJOR CROP



*Clemson College  
Laundry*



## WHY MILK IN NUTRITION?

CHARLES A. JAMES, III '43

Today there is a nation wide effort to provide food which will aid in keeping our country in superior health. It is the consensus of opinion among nutritionists that milk and milk products are the foundation of an adequate diet for adults as well as growing children and invalids.

Milk has long been known as an important food, but the reasons for its importance have been found in comparatively recent times. Nature provided milk with the intention of supplying the new-born with the proper nutrients for best growth. Man has taken advantage of this "most nearly perfect food" for his own use.

The average protein content of cow's milk is 3.5 per cent. This protein is more complete than any other, as it contains all the essential as well as the nonessential amino acids. The high quality of this protein facilitates the successful use of milk by itself or as a supplement for the amino acids not found in cereals. High quality protein is known to be absolutely necessary for growth and maintenance of the body.

Although milk does not supply an adequate amount of iodine and iron, the remaining mineral content is sufficiently high to overcome the deficiency. Milk is perhaps man's best source of calcium. A quart of milk contains about one gram of calcium. Phosphorus and potassium are also found in sizeable quantities. Sodium and chlorine are found in medium amounts, while iron, iodine, copper, manganese, zinc, and sulphur are found in small amounts. Minerals are needed in the production of sound bones and teeth, and they are also necessary in other bodily functions.

When the dairy cow is fed the proper rations, she produces milk extremely high in vitamins A and G. Dr. H. C. Sherman considers whole milk as the most important source of vitamin A in American and European diets. According to Roadhouse and Henderson, milk is the most important source of vitamin G.

Variable amounts of the B complex and vitamin C are found in milk. Vitamins D and E are found in moderately large amounts. All these vitamins mentioned are necessary for protection against disease, for growth, and for maintenance.

Milk fat acts as a medium for fat soluble vitamins, and both the milk fat and the sugar lactose, act as a source of energy. Lactose also provides a food for *Lactobacillus acidophilus*, beneficial bacteria found in the small intestines.

Milk is not an expensive food for the amount of nutrients it provides. It is highly palatable and can be almost completely digested and assimilated. All those who are anxious to enjoy a most healthful life should by all means make milk a part of their eating habit.

A new rubber substitute, utilizing natural gas in its manufacture, is being developed by Dr. Eugene P. Schoch, director, University of Texas, Bureau of Industrial Chemistry.



### COMPLIMENTS OF PEARMAN'S DAIRY

Anderson, South Carolina

### HOKE SLOAN MEN'S WEAR

R. O. T. C. Men Use Your Credit

CLEMSON CADETS ARE ALWAYS WELCOME

—at—

### MAYFAIR GRILL

Anderson —:— South Carolina





# THE AGRARIAN PRESENTS

## MR. L. M. BAUKNIGHT, B. S.

Mr. L. M. Bauknight, teacher of Vocational Agriculture in Easley, S. C., was the first man to teach agriculture in a high school in South Carolina. Mr. Bauknight has now been at Easley for over twenty years and is one of the oldest and best teachers in the country.

A graduate of Newberry, he took graduate work in Vocational Agricultural Education so he could teach his chosen subject. Not being contented with this, he took graduate work at Cornell too. In 1941 Clemson had the pleasure of awarding Mr. Bauknight his B. S. degree.

From the first year that he came to Easley he has had a growing interest in farming problems; both the student and farmer viewpoints came under his close scrutiny. Only a few boys were interested in taking agriculture, when he first started teaching in Easley, but their interest soon grew and now he has a large class of boys taking the subject. There were soon too many students for one man to adequately teach so an assistant Agriculture teacher was employed to teach the eighth and ninth grade.

Mr. Bauknight organized a Future Farmer of

America chapter at Easley early in his teaching career. The chapter participates in judging, speaking and other leadership activities.

He holds evening classes in all the communities around Easley. These classes are to introduce new and better farming methods to progressive farmers.

In recognition of his outstanding teaching and leadership qualities, he was, in 1937, awarded the distinction of being named "master teacher" of South Carolina. He has done much in helping the farmers increase crop yields and in the conservation of their soil. Many of his students have won prizes in cotton, hay, and other crop contests.

His winning smile and outstanding personality has won him an enviable spot in the hearts of many all over the South.

These are but a few of the many accomplishments of Mr. L. M. Bauknight a man that any publication would be proud to honor.

—THE AGRARIAN—

The College of Charleston is the oldest college south of Virginia and the oldest municipal college in the United States.

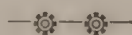
DRINK MILK

EAT

BUTTER

ENJOY

ICE CREAM



CLEMSON DAIRY  
DEPARTMENT



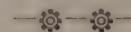
WATCH FOR

THE CLEMSON COLLEGE

SUMMER  
SCHOOL

ANNOUNCEMENT

PLAN FOR SECURING ITS ADVANTAGES



"What the world needs most of all is clean-minded, strong-bodied, educated young men."

A MIDWESTERN STATE COLLEGE DEAN



It's economical, labor-saving power-equipment like this Model 8 tractor and "40" All-Crop Harvester that Allis-Chalmers builds. It makes the family-farm independent of outside help and slashes production costs. When you buy A-C power, you buy power to fit the farm rather than get a farm to fit the power.

## SET YOUR SIGHTS FOR THE FUTURE

● There's no time like the present to give thought to the future. Next to farming itself, the business of supplying farmers with modern farm equipment is proving most attractive to many agricultural minded young men. An Allis-Chalmers dealership will keep you in close touch with agriculture, and offers great opportunities for service. It's a career which will enable you to contribute to independence and better living on the family size farm—through mechanization.

● The post-war world of tomorrow is already beckoning to the clear-eyed, straight thinking, strong-bodied American youth of today. It has a job for you . . . an opportunity that challenges the imagination of red-blooded young men, who are imbued with the fighting pioneer spirit of their forefathers.

To you men of tomorrow who love the soil, this challenge is particularly alluring . . . it calls for vision and daring . . . for planning, building, working toward a greater, more abundant agriculture than the world has ever known.

Power equipment for family size farms will be your ally. These family farms have always been the bulwark of American strength and character . . . yet for too long they were havens of drudgery and physical hardship. Allis-Chalmers considers it a privilege to contribute to their liberation—by developing power equipment to fit the needs of the family size farm.

YOUR "FURROW TO THE FUTURE" BEGINS HERE

ALLIS-CHALMERS MANUFACTURING CO.  
Dept. 43, Tractor Division, Milwaukee, Wis.

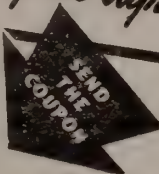
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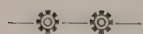
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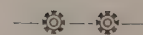
General view of Experimental Hot Bed



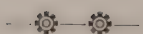
COURTESY S. C. EXPERIMENT STATION



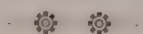
COURTESY S. C. EXPERIMENT STATION



Appearance of cotton growing at P. H. 5. O.  
on Cecil Sandy loam



Appearance of cotton growing at P. H. 6.5  
on Cecil Sandy loam



COURTESY S. C. EXPERIMENT STATION

## HORTICULTURAL PRODUCTS LABORATORY

Continued on page 6

and then allowed to ripen at somewhat lower temperatures a uniformly ripened and colored produce is obtained which may be handled satisfactorily.

The Horticultural Products Laboratory is 48 x 62 feet inside dimensions and has a concrete floor which is easily drained. Such a floor is important in the sanitation of a canning plant. The equipment includes a peeling machine, an exhaust box, two closing machines, four canning sinks, two cooking retorts, two cooling retorts, two steam jacketed preserving kettles, and an overhead electric hoist to handle the baskets of cans when they are placed in the retorts. The peeling and exhaust machines were designed and built by Prof. Van Blaricom.

There are only three peeling machines of the type used at Clemson in the eastern United States. The main advantage of this machine is that ripe fruit of high quality can be peeled without excess softening. For the peeling process, the halves are placed on a LaPorte belt which carries them first to a section of the machine that warms the skins by steam. While the skins are still warm, they are next carried to another section where they are sprayed with hot lye, which remains on the skins for approximately 25 seconds. Then the halves reach a third section of the machine, where they are sprayed with cold, pure water to remove all traces of the peeling and lye. From there they go to the canning sinks, where they are examined and graded before being placed in cans.

The consumer's reaction to the peaches canned at Clemson last season was extraordinary, as shown by sales of the fruit. There seems to be no doubt that if all South Carolina-grown peaches were canned in a similar manner the entire crop could be disposed of and consumers could eat South Carolina peaches the year round instead of just during the fresh fruit season.

The coming season it is expected that further work will be done with peaches, including varieties not tested last year. Experiments with other South Carolina-grown fruits and vegetables will be in progress when peaches are not in season. Equipment for putting in a quick freezing cabinet and storage room is on hand also. It is believed that at least some fruits and vegetables, other than peaches, offer possibilities for commercial canning in South Carolina and the southeast. This State now imports most of its canned products from other sections, and if the Horticultural Products Laboratory can demonstrate that these products can be successfully and economically processed in South Carolina, it will be a real contribution to the welfare of the State. In 1940 California alone canned twelve million cases of

peach products as compared with two hundred and fifty thousand cases for the rest of the United States.

The fact that California can sell canned peaches at a profit after shipping them across the continent should, in view of the experiments last season, encourage the development of a canning industry here.

—THE AGRARIAN—

## Barley for the Feed Crop

From no acreage a few years ago, barley has been promoted as a needed crop in Sumter county until now it is rather generally planted. It appears to have won its place on the farms of the county because farmers like it. It fills a distinct need, and it makes profitable yields here. County Agent J. M. Fleazer reports that on 19 demonstrations the past year covering 163 acres the average yield was 29½ bushels per acre. "It has the value of corn, costs only a third as much per acre to produce, and we can make as many or more bushels per acre", he says. "With labor so scarce and high, the planting of this crop, which requires much less labor than corn, was enlarged in the fall."

—THE AGRARIAN—

In the Aiken area of S. C. is found the largest and purest sedimentary kaolin deposit in the United States.

### PROTECT YOUR PEACH CROP

—with—

## PAN PEACH SPRAY

PAN contains all the necessary ingredients to assure maximum protection.

### SIMPLE TO USE

PAN is used at the rate of 8 pounds to 50 gallons of water and is put up in convenient units:—Cases of 4-8 lb. bags, cases of 2-16 lb. bags and cases of 4-16 lb bags.

Leading peach growers throughout the country find PAN PEACH SPRAY the best answer to their spraying problems.

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## The J. W. Woolfolk, Ltd.

MANUFACTURES

Fort Valley,

Georgia





COMPLIMENTS OF

## L. C. Martin Drug Company

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Official College Book and Supply Store

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CLEMSON COLLEGE



SOUTH CAROLINA

## THE EPTING DISTRIBUTING CO.

LEESVILLE, SOUTH CAROLINA

STATE DISTRIBUTORS

## TENNESSEE BASIC SLAG

MANUFACTURERS

## Fertilizers — Feeds — Insecticides

SPECIALISTS IN FARM SEEDS OF SUPERIOR QUALITY

INQUIRIES SOLICITED ON:

ROTENONE DUSTS ♦ PY-RO CATTLE LOUSE POWDER—Extension Formula.  
DUSTING AND SPRAYING EQUIPMENT ♦ PASTURE SEEDS: White Dutch  
Clover, Dallis Grass, Carpet Grass, Common Lespedeza ♦ LESPEDEZAS: Certi-  
fied Kobe, Korean, Tenn. 76, and Common. ♦ CUSTOM HAULING & SCARI-  
FYING Lespedeza & Crotalaria ♦ CROTALARIES: Straita, Giant Straita, Late  
Spectabilis, & Early (Carolina) Spectabilis ♦ VETCHES: Hairv. Common,  
Augusta, & Mixed ♦ AUSTRALIAN WINTER PEAS ♦ CRIMSON CLOVER  
♦ URBANA INOCULANTS for All Legumes ♦ SOYBEANS COWPEAS  
♦ VELVET BEANS ♦ CATTAIL MILLET for Dry-Weather Summer Pastures  
♦ SEED OATS, WHEAT, RYE, BARLEY ♦ MEAT SCRAPE, FISH MEAL, PEA-  
NUT MEAL, 45% Protein ♦ ALFALFA MEAL ♦ DRIED BUTTERMILK  
♦ THE PARAMOUNT LIME SPREADER (Trailer Type).

Ask for Literature, Name of Nearest Dealer, and Prices on

TENNESSEE BASIC SLAG, Carlots or Trucklots

# Green Fields Open New Frontiers for YOUTH



When mankind was young, in the pre-agricultural or pastoral period, the frontier was a new-found, far-off grazing ground. Even in the memory of men yet living the frontier was still geographical—forests laid waste by the woodsman's axe... virgin sod turning to golden fields of wheat and flax... everywhere the exploration and exploitation of added earth.

Frontiers for youth today are not in the narrow old earth, but in the boundless acreage of new ideas, new knowledge, new methods, new machines. Late discoveries in forage reveal new frontiers in soil conservation and livestock feeding. The new Case Sliced-Hay Pick-Up Baler, final stage in making air-conditioned hay by the Case System, opens one of these frontiers. It enables every-day farmers to capture and keep more protein and more total nutrients... more color and palatability... more vitamins and minerals... than ever before was feasible with field-cured hay. This compact, continuous-feed baler works with a small tractor and a total crew of three, takes seven-foot windrows at the same speed as mower and side-rake, builds bales that separate into sections as easy to feed as serving sliced bread.

New frontiers for youth are the fruit of free enterprise. Youth's chance is in progress. Only where men and money are free to dare, to risk loss in hope of gain, is there place for young ideas, young energy, young courage. Now, as a century ago, this company takes youth's part. J. I. Case Company, Racine, Wisconsin.

In 1842 the youthful Jerome I. Case began to furnish American agriculture with grain-saving machines. In 1942 the company he founded is celebrating its centennial with national ceremonies, historical pageantry, and educational exhibits. You are invited to witness these special events of the Case Centennial year. Look for local and regional announcements.

1842  
**CASE**  
**Centennial**  
*Jubilee*  
1942

# CASE





# ABOUT THIS AND THAT

BY THE EDITORS



## An Open Letter To All Students

You are probably aware that Clemson College is infested with a multitude of pseudo-service and pseudo-named organizations that only serve as stepping stones to larger and still more useless fraternities that issue keys by the bushel, service by the gram, and then sit complacently aside with a smile of satisfaction and an air of accomplishment.

It is up to the students of Clemson to remedy this deplorable situation that reflects on every undergraduate. And it's up to the Club officers to insure remedial measures being taken.

Is your club a mecca for aspiring sophomores and juniors who cease to be active members as soon as keys have been awarded and officers elected?

What did your club do this year? Let me guess. There was a social, and open house, perhaps a Christmas dance—any thing else? If not disband or reorganize. An organization that can't justify its existence has no business at Clemson, and at times like these least of all.

Many of our otherwise worthy organizations have become a laughingstock for the cadet corps because of their generosity in awarding tokens that should represent achievement and not merely membership. Is there any reason why keys should not be allowed to be presented to anyone but seniors since they alone can wear them?

This condition isn't confined to the Agriculture or Education school—it is a contagious malady that has all of us in its grasp. Since it is school wide let's unite as a school and stamp it out . . . NOW!

—THE AGRARIAN—

## Victory Program

Launching a seven-point Victory Program by South Carolina farm boys and girls through organized 4-H Clubs is announced by Dan Sawyer, state boys' club agent and Mrs. Harriett Johnson, state girls' club leader. Basis of the program was laid down in a discussion of civilian defense at a recent conference in Washington between 4-H club leaders in the Department of Agriculture and Mrs. Franklin D. Roosevelt.

The program call for (1) interpreting to the community the four freedoms: Freedom of Speech, Freedom of Worship, Freedom from want, and Freedom from fear, (2) making every effort to produce and conserve needed foods in 4-H club projects, (3) saving for victory, collecting scrap metal, burlap, old paper, etc., (4) developing individual and community health, (5) learning useful technical and

mechanical skills and volunteering for civilian defense work, (6) practicing the democratic procedure, and (7) understanding the social and economic forces at work through discussion groups and other organized activities.

The Program is a wartime revision of a seven-point program which 30,000 4-H club members and 1800 local 4-H club leaders in South Carolina have been carrying forward for the last year and a half.

—THE AGRARIAN—

## Why?

Oconee County, one of the smallest and least prosperous counties of South Carolina, last year refused twenty-five thousand dollars. This sum of money was every bit turned down by Oconee farmers, and God knows they can ill afford to lose even one penny. Perhaps these farmers do not even know of their loss, but with eighty professional workers in agriculture in the county, each farmer should have been contacted and assisted in saving his share of the lost fortune.

Farmers in Oconee County probably will say, "We lost \$25,000? Shucks, we haven't had that much money." True, but this money was lost through negligence in failing to take advantage of government soil building payments under the AAA Soil Building program.

Let's expand this sum to cover the entire state. There are forty - six counties in South Carolina. Assuming that each county lost approximately the same amount as Oconee, the total loss to South Carolina farmers was \$1,150,000! That sum is greater than South Carolina's allotment from the Federal government for agriculture teachers. Had they done nothing other than persuade farmers to take full advantage of these payments, their salaries would have been fully earned. \$1,150,000 would be one dollar for each man, woman and child in the state. \$1,150,000 equals the total amount of money appropriated the University of South Carolina, The Citadel, Winthrop and Clemson College for one year by the state legislature. The refused soil building payments would have aided in educating our youth.

On whom does the responsibility for these losses rest? On the teachers of vocational agriculture, on the county agents, on you, you, and you—the agricultural leaders of the state. And \$1,150,000 was not the only loss, because the soil lost fertility instead of gaining it; yields have decreased instead of increasing and the average farm income in South Carolina has stuck near its \$240 level. Snap out of it and pay your own salary by helping the farmer get his just deserts . . .

## SWEET POTATO DISEASES

Continued from page 4

the potatoes will be selected from the field by inspecting closely for evidence of wilt, black rot, and scurf. It has been found desirable to let the potatoes remain in the field from one to two hours before picking. Those selected and carefully handled are stored separately for seed potatoes. Storage conditions will be taken up last.

The most disease free of the previously selected potatoes are dipped, for at least eight minutes and not longer than ten minutes in a 1-1000 (1 ounce in 8 gallons of water) solution of mercuric chloride just before being bedded the last of March and first of April. This operation, rendering the potatoes poisonous as food, kills the scurf, wilt and black rot which may be present on the outside of the potato. Semesan Bel has been recommended by some manufacturers for the disinfection, however, the South Carolina Experiment Station has not found it to be as effective as the mercuric chloride treatment.

Bedding is done in new soil, the upper four or more inches in which the potatoes are located having been treated with 1-3 pound of hydrated or builders lime per square foot bed area. This practice, recommended by the South Carolina Extension Service, aids in the control of various seed bed rots with a resulting increase in the number of slips obtained per bushel. The old seed bed soil may be used when properly sterilized with steam.

Slips are taken from the bed, all those appearing diseased discarded, and the desirable ones set in a field where not one potato has been grown for at least three years. Manure used in the field can sometimes cause serious infection even though potatoes haven't been planted on the soil for some time. In the Coastal Plains at the Edisto Experiment Station, it was observed that a greater per centage of number one's free from diseases were obtained from vine cuttings than from slips. The relatively shorter growing season in the Piedmont prevents the production of an entire crop from vine cuttings, new seed potatoes should be obtained in this way because they are usually more free from disease than otherwise. With careful selection, the use of vine cuttings, disinfection of seed potatoes, and crop rotation, field diseases can be controlled.

Now, what shall be done about the control of the storage house diseases? Proper curing and storage temperatures and relative humidity is usually the answer to these rot problems. The old method of curing, reported by some as satisfactory, used a temperature of 80 to 85 degrees F., for from 7 to 15 days with all possible ventilation. At present, the U. S. D. A., recommends a temperature of 80-85 degrees F., humidity of 90%, and only enough ventilation to prevent the condensation of moisture on the walls.

Under these conditions, the wounds and bruises

on the potato heal very quickly, thus preventing the entrance of the soft rot organism. After the curing period is over, the storage house should be held as close to a temperature of 55 degrees FF., as possible and at a relative humidity of 85 to 90%. Such storage conditions will very appreciably check the spread of the black rot.

—THE AGRARIAN—

## Education With Jersey Insurance

Continued from Page 5

Every year we have been successful at the fairs. Two years we took our cows to three fairs. Most of our money has gone back into the herd. This past show season we won two fourths, five thirds, fourteen seconds, twenty seven firsts and six championships.

We started selling grade "A" milk in 1938, and hired a herdsman. The next year it became necessary to add another man to assist him.

The Annual Jersey Sale is held at our home town, Newberry, S. C. As I was ready to enter college in the fall of 1940, we placed four heifers in the sale. The returns from these four heifers paid my expenses at Clemson the first year. My brothers had the full responsibility of raising the calves while I was away at college. As another brother was entering Clemson in the fall of 1941, and the expenses of the two of us would amount to quite a sum, we had to place nine head of heifers and first-calf cows in the Annual Sale for that year. We had reason to be very much pleased with the returns from this sale. The nine head sold for \$2,025, for an average of \$225.00 each. One of our heifers almost topped the sale, selling for \$340.00.

Last fall two of my brothers were members of the dairy judging team which won first place in South Carolina. As a reward for placing first in the state they were given a trip to the National Dairy Show. My father and I also made the trip. This was one of the most educational trips that I have ever taken.

Our Jersey Insurance policies are maturing and paying dividends, besides helping to change our farm from a one-crop cotton-farm into a dairy farm. Our January 1942 inventory shows Eighty-five head of registered Jerseys.

Since the beginning of our Jersey Insurance policy another boy has been born into our family, and we have already purchased his own particular "insurance cow-policy" although he is not yet two years-old. In times like these when we can be certain of few things, we are quite confident of this—that our little brother will earn his "dip" as we are now earning ours, along the "Milky Way."

—THE AGRARIAN—

Producing vegetables at home puts the food supply right where it is to be used. It doesn't take any freight cost or trucks to move the food to those families and transportation is needed badly for other things these days.



## The Tax Situation

"Not only has tax delinquency deprived units of government of millions of dollars of public revenue, but it has exerted a depressing influence upon property values and, unless checked will gather momentum each succeeding years."

So declares Dr. Aull, head of the Agricultural Economics Department of the South Carolina Experiment Station, in Experiment Station Bulletin 337, "The Nature and Extent of Tax Delinquency in South Carolina." The publication, now ready for free distribution, may be had from the Publications Department of Clemson.

"The study reported in the bulletin indicates that tax delinquency has become chronic in the case of many farms and is acute at some time or other on three out of every four of those listed for taxation," says Dr. Aull. "The average farm property in the state is delinquent once every two years."

"The situation is distressing because it is evidence of widespread and gross inequalities in the assessment of property for tax purposes," Dr. Aull continues. "If farm properties were equitably assessed, one of the most important causes of tax delinquency would be removed."

The bulletin reports on the trend of delinquency, as to properties, acreages, and taxes, frequency of delinquency, characteristics of delinquent and non-delinquent properties, the current status of delinquent properties, with some conclusions and suggestions on bringing about improvements in tax delinquency.

—THE AGRARIAN—

## WASH DAY

Git up nigger! Ain't you shame?  
Sittin dere in dat col' shade.  
Here I'se washin' clothes agin.  
'N de crop ain' nere don' made.  
Ain't yuh see dat grassy corn?  
Caint yuh see dem weed?  
See dat hoe 'gainst de bahn?  
Aint yuh mule need feed?  
H'yer yuh chillun. Come 'ere quick!  
Caint yuh hear me squall?  
Ain't yuh gonna hep yer ma.  
Washin' clothes 'n all?

## BODIFORD'S

Clemson's Reliable

Cleaners and Pressers

## Orangeburg's Big Hog Crop

In December the Orangeburg Livestock Association completed in four sales one of its best month's business, when 2356 hogs weighing 473,475 pounds sold for 373 farmers, netting the farmers \$47,363.67. The record for any one sale during the past year took place on December 17 when 715 hogs were sold for \$15,053.11. The association in the first half of its year's business has sold 8517 hogs which returned to the growers \$170,218.56. This shows a substantial increase over the same period last year. From last year's total sales, farmers received over \$233,000 for their hogs. "Indications are that this year's sale of the association will exceed that of any previous year", says County Agent R. D. Suber. "Hogs have been moving to market through the association in fairly regular numbers. The highest price at any one sale was 11.55. A higher percentage of the hogs sold are grading No. 1 than ever before. This is evidence that farmers are feeding out hogs to a better condition for market."

—THE AGRARIAN—

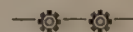
Are you sometimes looked upon as a trifle weak-minded because you are an ardent lover of animals—champion of their rights against man's thoughtless cruelties? If this is the case you are in excellent and distinguished company—of kindred spirit with men like Carlyle, Joweth, Mill, Tennyson, Manning, Martineau, Browning, Alfred Russel Wallace, Victor Hugo, Henry Irving, John Ruskin, Dickens, Galsworthy, Henry Beagh, George T. Augell and Phillips Brooks.

## MILK IS VITAL . . . !

. . . for HEALTH

. . . for SUCCESS

. . . for VICTORY



## CLEMSON COLLEGE CREAMERY

(This ad Prepared by C. C. Graham)

# 1942 *Today* AMERICANS ARE **RE-DISCOVERING** **THEIR AMERICA!**

A WONDERFUL NEW WORLD—this American treasureland which Columbus saw from the deck of his flagship in 1492. A wild and virgin land—a land of immeasurable hardship, *and of hope!*

Here the foundations of liberty were laid in the centuries that followed. Here the founding fathers created a new miracle of government. The year was 1776, and they wrote down a heaven-sent dream and wrought it into fact.

They bequeathed to us the United States of America, and their sons and grandsons made it great and strong.

Had we forgotten, in recent years, to be grateful for our American way of life? Yes, most of us had. But now that we stand in peril of losing it—we *remember*. Now that we must fight with all that we have and are, to hold that heritage, we look back on the hard history that lifted us up on the heights. And we review the later years that have brought us to this bitter hour.

Today, in 1942, the mists are clearing from our vision. The Nation is at war. Americans are *re-discovering* their America.

★ ★ ★

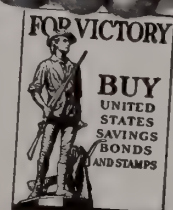
NOW, AS IN THE DAYS of the pioneers, Agriculture is the foundation of American security *and of American survival*. In the fight for Victory the man who really  *fights*  leads all others in our devotion. And here, *back home*, no man's job is greater than the farmer's job. He must raise the food that freemen need.

INTERNATIONAL HARVESTER *pledges* that its utmost effort shall be rendered—through its factories and the men who build its products, and through the dealers who service and sell its machines—to the end that the people of America may win their way to early victory and peace!

**INTERNATIONAL HARVESTER COMPANY**  
 180 North Michigan Avenue Chicago, Illinois



"We, the INTERNATIONAL Dealers and Servicemen of America, will give our best to help keep farm equipment, old and new, on the job till peace is won!"



## INTERNATIONAL HARVESTER SERVICE...FARM EQUIPMENT...PARTS



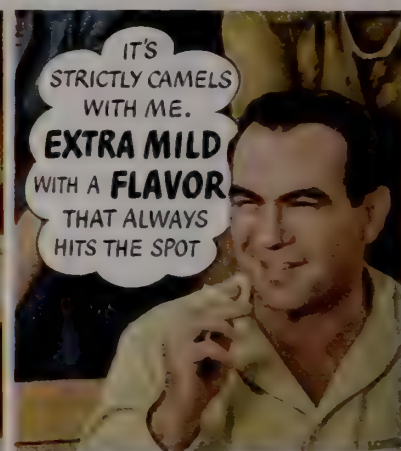
# "SET 'EM UP" — FOR CHAMPION LOWELL JACKSON



**AND SET UP THE CAMELS, TOO**  
... Whether you're in there  
bowling yourself—or watch-  
ing — nothing hits the spot like  
a cool, flavorful Camel

TALK ABOUT your wood-gettin' wonder! You're looking right at him — "Low" Jackson of St. Louis, 1941 All-American, captain of the world's match game champions, and possessor of one of the highest-scoring hooks in bowling today. Light up a slower-burning Camel and watch this champion in action.

THERE'S A SWIFT FLASH of the arm. The snap of a wrist. The ball whirls down the alley. Take a good long look at the way "Low" Jackson tossed that one—that's an All-American hook. Close to the gutter. Three-quarters down, she starts to break—straight for the slot. Watch it now—it's—



**C-R-A-S-H!** A perfect hit! The very sound of 'em falling sets you tingling all over. Like a homer with the bases loaded...a hole in one...like the full, rich flavor of a certain cigarette, it never fails to thrill. No matter how much you smoke, there's always a fresh, welcome taste to a Camel—for Camels are milder with less nicotine in the smoke.

**THE SCORE-BOARD** tells the story. More smokers prefer Camels...smokers like Lowell Jackson to whom mildness is so important...smokers who want a flavor that doesn't tire the taste...smokers who want more out of a cigarette than something to carry in hand or pocket. You'll never know what you've been missing until you smoke Camels.

**TWENTY TIMES** "Low" Jackson (above) has rolled the perfect score (300). Every time he lights up a Camel he smokes with the assurance of modern laboratory science that in the smoke of milder, slower-burning Camels there is less nicotine (see below, left). Get a package of slower-burning Camels today, and smoke out the facts for yourself.

The *smoke* of slower-burning  
Camels contains

## 28% LESS NICOTINE

than the average of the 4 other  
largest-selling brands tested—  
less than any of them— according  
to independent scientific tests  
of the smoke itself!

● By burning 35%  
slower than the average  
of the 4 other  
largest-selling brands  
tested — slower than  
any of them — Camels  
also give you a smoking  
plus equal, on the  
average, to

**5 EXTRA  
SMOKES  
PER PACK!**



# Camel

—the Cigarette of  
Costlier  
Tobaccos

R. J. Reynolds Tobacco Co., Winston-Salem, N. C.



# *The* Agriarian

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



THE CLEMSON COLLEGE DAIRY PLANT

May, 1942

Clemson, S. C.



# One-man army!



**H**E doesn't carry a gun. He never learned to fly a plane, or drive a tank, or toss a hand grenade. But he's a one-man army, just the same.

**He's an American farmer, fighting the battle of food.**

On his own battleground, he's his own General and his own General Staff—free to plan his battle as he sees fit. Yes, and he's his own buck private, ready, if need be, to execute his plans single-handed.

He's on his own. He doesn't expect reinforcements. It's his own fight—an uphill fight to make *his* land produce more and still more

of the food that will win the war and write the peace.

**Electricity is one of his most important weapons.**

Electricity means more *production* with the same amount of work. Electricity means more *time* for productive effort. Electricity means more *efficiency*, more *economy*, greater *comfort*, better *health*. Electricity is one of the reasons why American agriculture, like American industry, will out-produce the world.

★ ★ ★

Electricity can help in the big job of food production that lies ahead

of you. Now is the time to find out how to use it most wisely and profitably, how to make it the greatest possible help to you and to the country.

And, when you look to electricity, look to Westinghouse—the name that stands for the highest development of all the good things that electricity makes possible.

## AGRICULTURE: WEAPON OF VICTORY

America must and will win the battle of food. To the young men preparing to wage this all-important battle—today's students in American agricultural colleges—Westinghouse pledges its fullest cooperation.

# Westinghouse

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, Pittsburgh, Pa.

**ELECTRICAL PARTNER OF AGRICULTURE**

# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 4



No. 4

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CLEMSON COLLEGE



SOUTH CAROLINA

# PLAN NOW...

## A Post War Agricultural Program

Guest Editorial — By M. E. Abrams, State Senator

The southern farmer has until the outbreak of the present war, depended upon foreign markets to take care of his surpluses of farm products. But now that the last foreign buyer has been eliminated and he has no foreign market in which to unload his surplus, he will have to learn to take care of himself and find other sources of income and new uses for the things he grows.

Already some, who are farsighted and are thoughtful are beginning to inquire and to ask what is most likely to happen to agriculture when the war is over? When our farmers are harnessed to full production, what are we going to do with the surpluses of wheat, of cotton, of tobacco, etc., that have piled up in our warehouses during the post war period?

How are we going to keep our industries producing at full capacity and employ our industrial workers so they can buy the goods our farmers produce?

Not only must America plan to win this war but she must plan to avoid a recurrence of internal depression and find ways and means of preventing unemployment at the conclusion of the war. She must provide for the distribution of farm products so that her bread winners will not be forced to go hungry and roam the country seeking employment like they were compelled to do after World War number one.

Another inquiry some are making: can the southern farmer compete with his South American neighbors in the production and cost of farm products? Can he who pays a high scale of wages and provides a decent standard of living compete with his neighbor who does not pay a living wage and does not maintain a high standard of living? Can he sell in a foreign market when his costs are much higher than his competitors? Yes, he can provided he grows a better product and increases his yield to such an extent that the cost can be greatly reduced.

While the war does furnish a money making opportunity and for once the southern farmer seems to be lucky he should nevertheless not depend entirely upon crop farming but should supplement his farm income by raising livestock and finding other sources of income.

He should grow wiser from past experience and not put all of his money and energy in the production of one crop, but should engage in other industries that are profitable. Let him grow a good type of beef cattle and have a few hogs for sale so as to help out

the farm income. Improve and sod the pasture so that the cost of growing the extra beef cattle can be kept to a minimum.

Now as in the past the chief cause for the unsuccessful growing of livestock is lack of home grown feed due primarily to poor soils brought about by a system of farming not conducive to soil building and soil conservation. Permanent pasture is necessary in any system of profitable stock development. More livestock, more poultry and more dairying to offset our sole dependence on crop farming, will not only make up for our lost cotton and tobacco markets, but will also provide a twelve months income producing period which enables the man on the farm to enjoy modern standards of living.

"The only real hope for the farmer in the heart of the agricultural South and West," said Walter W. Liggett in Scribners several years ago, "is the establishment of packing plants, canneries, cooperative creameries, factories to make paper and fiber boards and distillers to render industrial alcohol from waste farm products, so that the sons and daughters of farmers may have gainful employment close to their homes and also be available for work on the farm during the height of the seasonal activity."

The prospects for increased income to the southern landowner from the growing and sale of well protected and well managed tracts of timber are very promising. Where care and attention is given to the cutting of the trees so as to leave stands of growing timber on the land and where due caution is practiced in the keeping of fire out of the woods very substantial profits are realized. During the winter months spare time can be spent very profitably in the thinning of the timber to a stand and otherwise protecting same, for the growing of good timber pays and pays well. Someone has said that neglect of the forests costs the American farmer over a hundred million dollars a year.

"When it isn't raining the famous Arkansaw Traveler could not be interested in patching his roof because he didn't need it and in rainy weather he couldn't get out of the house long enough to do it. So the roof was never patched."

But when it comes to sound planning to keep our industrial workers employed and the produce of our farms from piling up in huge surpluses it will be a tragedy indeed if agriculture becomes complacent and neglects to provide for the post war period.





# THE AGRARIAN EX-



**EDWARD P. HUGUENIN**  
"Deacon"

**Editor-in-Chief**

Agricultural Education Major from Ridgeland . . . Associate Editor, '41 Agrarian . . . Calhoun Forensic Society . . . Strawberry Leaf . . . Parliamentarian, Dairy Club . . . Executive Committeeman, Young Democrats . . . Delegate at State Convention and College Organizer of the State Young Democrats . . . Secretary-Treasurer, Vice President of The Carnegie Music Study Society . . . Likes to Write . . . Talented Journalist . . . Loves Classical Music . . . Pet Hates—Peroxide Blondes, Boogie-Woogie, Cowboy Movies . . . Dignified . . . Friendly . . . Capable . . . Persistent.

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**BENJAMINE R. LEONARD**  
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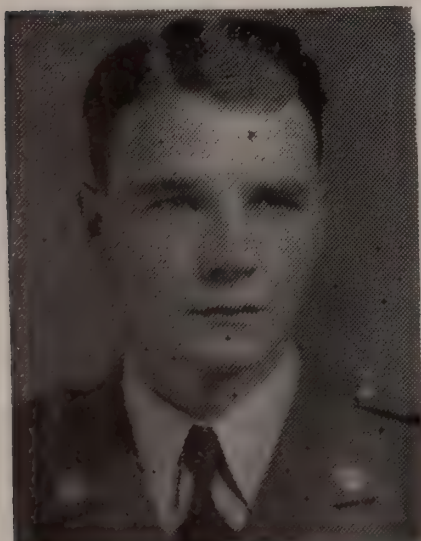
**Circulation Manager**

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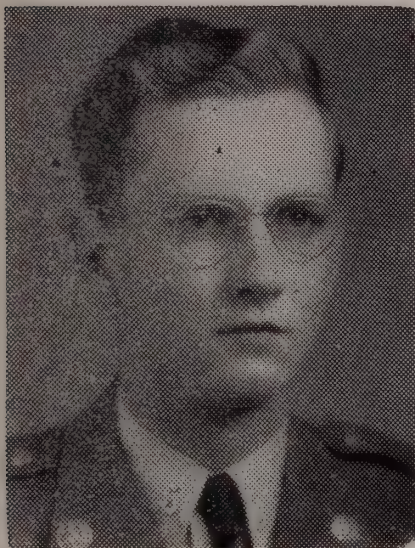
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# ADMINISTRATORS



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"S. K."

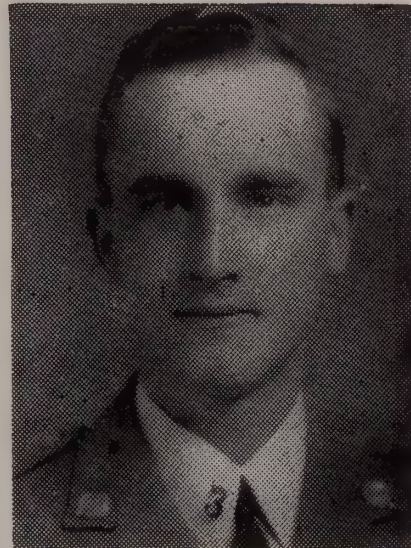
## Co-Editor, Managing Editor

Agricultural Education Major from Charleston . . . Cadet First Lieutenant . . . Gamma Alpha Mu . . . Strawberry Leaf . . . Debating Team . . . Loves Writing and Cartooning. . . Likes Any Kind of Music . . . Reads Novels. . . Likes Blondes especially Betty Grable . . . Shy With Women . . . Excellent Journalist . . . Infantry After Graduation then Agricultural Journalism . . . Conservative Dresser . . . Friendly . . . Personality plus . . . Conscientious.

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"ED"

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## New Departmental Editors

J. S. Schaffer . . . Agricultural Economics  
St. Clair Knight . . . Agricultural Engineering  
T. C. Moss . . . Animal Husbandry  
W. S. Jackson . . . Agricultural Education  
J. B. Pate . . . Agronomy  
E. B. Collins . . . Dairying  
C. K. Stuart . . . Horticulture  
Q. L. Chapman . . . Zoology and Entomology



# THE VALUE OF FORAGE CROPS IN THE PRODUCTION OF HOGS

By T. C. Moss, '43

It is a matter of common observation that pigs do better when given access to green feed than when confined to a dry lot. Strickly speaking, the pig is not a grass-eating animal, but he, nevertheless, is able to consume an amount of forage which may contribute materially to his support.

Our cereal grains are deficient in some of the essential proteins as well as being deficient in a sufficient amount of proteins. Also, our cereal grains are lacking in vitamins A and D and quite frequently minerals, especially calcium and common salt. Here is where forage crops are most important, for they not only tend to act as a part protein and mineral supplement but they are also rich in vitamins.

Investigations by Woodman and Norman of the Institute of Animal Nutrition, Cambridge, showed that pigs from 150 to 195 pounds in weight which received 68 per cent of a full meal ration ate 4.4 pounds of cut grass daily. Eighty-five per cent of the dry matter of the meal was digested and 60 to 62 per cent of the grass. The conclusion was drawn that one pound of mixed meal is equivalent to 6.3 pounds of fresh green pasture.

There has been quite a lot of discussion on the subject of dry lot versus forage feeding. The following information is taken from PORK PRODUCTION by Smith:

**Dry Lot Versus Forage Feeding**  
(Average 25 Experiment, 17 pigs to Acre)

	Average Daily Gain	Average Concentrates to Produce 100 Pounds Gain	Concentrates Saved per Acre of Forage	Amount of Pork Accredited 1 acre of Forage
Dry lot	lb. 1.106	lb. 404	lb. —	lb. —
Forage	1.355	356	1,147	284

The above information was gathered by Smith from experiment station data. The trials in each case began soon after the pigs were weaned and continued until they had reached approximate market weights which represented, on the average, a period of 106 days. Rape was the forage used in six trials, red clover in four, timothy in three, alfalfa in ten, a mixture of rape and oats in one and soybeans in one. Only those experiments were considered in



Courtesy S. C. Extension Serv

Abundant forage means cheap gains.

which practically full and well-balanced grain rations were fed in both lots. The amount of the protein Supplement allowed in the forage lot was usually less than the amount fed in the dry lot. The ration most commonly fed was corn and tankage.

Although the pigs in the dry lot were fed rations which were fairly well-balanced according to standards, those having access to forage made an extra daily gain of one-fourth of a pound, on the average; in some cases the difference in the rate of gain was greater than this, and in others it was less. None of the hogs in the dry lot gained as rapidly as those on forage. At the end of the feeding period, the forage feed pigs were, on the average, 27 pounds heavier.

Mr. Godby of the South Carolina Experiment Station grazed spring pigs on soybean forage at the rate of 12 pigs per acre during each of four years. They were turned in when the plants were about eighteen inches tall; the pigs weighed fifty pounds. They were grazed for a period of 106 days, on the average, and weighed 200 pounds when the trials closed. The ration fed was a full-fed of corn and a half feed of tankage. By comparing the results with those obtained by comparable groups of pigs fed by the same ration in dry lots, it was calculated that an acre of beans saved 1,184 pounds of feed (corn and tankage) or should be given credit for producing 376 pounds of pork per acre. It has frequently been stated here that soybeans are the best summer and fall forage crop for South Carolina.

A summary of the benefits from growing forage are as follows: pigs on forage make faster gains

Continued on Page 22



# THE CLEMSON COLLEGE DAIRY PLANT

EDWIN B. COLLINS, '43

Editor's Note: The entire layout of the dairy plant is on the front cover.

The Clemson College dairy barn is located one-half mile southeast of the Clemson College main building. The one story building, surrounded by permanent pastures, is made of glazed tile with steel trusses. Before the United States entered the present war, a competent engineer estimated the dairy plant at a value of \$80,000. At the same time the herd of Holstein, Guernsey, and Jersey cattle was valued at \$38,000.

In the herd there are 332 female animals and two bulls of each of the three major breeds of dairy cattle. At present, the 171 milking cows are averaging 30 lbs. of milk each day. The Holsteins average 38 lbs., the Guernseys average 24 lbs., and the Jerseys average 23 lbs. of milk per day. The daily herd production is approximately 600 gallons. Three hundred and fifty gallons of this milk is used each day during the school term by the college mess hall. The remainder of the milk is used in the college creamery for student laboratory work, dairy products research, and retail sales. During the summer months the milk has been largely sold in the form of ice cream at the roadside market and the creamery. Any surplus has been disposed of through ice cream companies. During the summer of 1941, Fort Jackson received a considerable quantity of milk from Clemson, and it is likely that this will be repeated this year.

The original dairy barn, which was constructed in 1911, burned in February, 1935. During the summer of the same year, the barn which now stands was completed, situated on the same site as the old building. Since the original foundation, water system, sewer, and calf barns could be reused, and since 1935 was a very economical year for obtaining building material, the new barn, milking parlor, and equipment cost only \$43,000. Since Clemson is a permanent institution for teaching and research work, the new barn was built with that fact in mind. Though the barn is made of tile and steel, the same plans can be easily used in building barns with many different and less expensive materials. A dairy barn is a farm factory in which the home grown feeds represent the raw materials to be converted into human food by the dairy cow, which represents the machinery of this factory. Recognizing this fact, milking parlor, vacuum pumps, motors, feed grinder, and many other labor saving devices were used in equipping the Clemson plant, so that it can be operated on a semi-industrial basis with as little hand labor and drudgery as possible. There are 29 electric motors used in operation ranging from a 30 horsepower motor, which drives the feed grinder, down to a 1-8 horsepower clipping machine.

Many research projects are carried on by the dairy department. Some of these are artificial



Courtesy S. C. Experiment Station

Insimination, physiology of the dairy calf in relation to the consumption of milk, control of digestive disturbances of calves being fed on milk, cross-breeding to determine hybrid vigor and other interactions of genes in the hybrid, permanent pasture study, types of winter roughages best suited to this region, blue mold cheese, and the effect of various southern feeds upon the chemical and physical properties of milk produced.

A graduate of the University of Kentucky, Prof. J. P. LaMaster is head of the Clemson College dairy department. While Prof. LaMaster was in the University of Kentucky he was a member of a judging team which won first place in a judging contest at a National Dairy Cattle Show in Chicago, Illinois. At one time Prof. LaMaster was bacteriologist and assistant superintendent of Elmendorf Farm, a certified milk farm of 400 cows near Lexington, Kentucky. Immediately prior to his coming to Clemson, Prof. LaMaster was with the U. S. Department of Agriculture doing dairy cattle extension work in Washington, D. C. Other members of the dairy department's staff are: Prof. B. E. Goodale, associate professor of dairying, Dr. G. H. Wise and Dr. P. G. Miller, associate dairymen on the experiment station staff. Dr. G. W. Anderson does research work in animal pathology with the dairy, animal husbandry, and poultry departments.

The Clemson dairy department has become one of the most outstanding in the southern states, and it is continually bringing more emphasis upon the growing importance of dairying in this region.





# Blueberries As A Fruit Crop For The South

By C. K. Stuart, '43

Blueberries serve as a very good fresh fruit and are also excellent for cooking.

Pioneer work on blueberries was done by Dr. F. V. Coville the United States Department of Agriculture around 1920. About the same time Miss Elizabeth White of Whitesbog, New Jersey also did some very interesting work on selection of outstanding wild plants. Most of Dr. Coville's work was done on the culture of blueberries. In his work, Dr. Coville used the northern bush type. He discovered that blueberries do well on very acid soils having a pH. of 4.4-5.1. This discovery was of very great importance because it opened a field for crop thriving on acid soils.

Breeding and selection work is being carried on in a number of states including New Jersey, Michigan, Mass., and also by the United States Department of Agriculture. At the present time workers of the United States Department of Agriculture are attempting to develop types that are adaptable to the Southeast. Their work as present includes the crossing of many northern bush varieties with selection from the southern states, an attempt to develop a variety of high quality that will be adaptable to the southern states.

The chief objection to the southern varieties of blueberries is that they do not possess the high quality that the northern varieties possess. Other objections to most of the southern varieties are that some have large seeds, some have a glossy black color instead of the desirable light blue color and some varieties are very difficult to pick as the berry tears when picked. Even some of the berries contain grit cells, which is a very undesirable characteristic; on the other hand, many plants produce large well colored berries containing small seeds and possessing fair picking qualities. These types of berries may be used in breeding work with the aim of combining these desirable characteristics with the excellent flavor of some of the northern types. This work should produce berries that are adaptable to the South and in addition have the desirable qualities that are found with many of the northern varieties. Many wild varieties of blueberries grow in the south. Many of these wild varieties are being tested with the aim of finding a wild plant possessing many desirable characteristics.

The main reason the North has more desirable characteristics than the South is due to the fact that the breeding and selection work has been carried on in the North since around 1920. Breeding and selection work on blueberries is relatively new for the South, as little work has been done on this berry until the last few years.

At the present time Dr. George M. Darrow of the United States Department of Agriculture is doing considerable work on the southern type blueberry. Several selection have been made on the southern type including such varieties as Myers, Hagood, Long, West Florida, and Black Giant, which are being propagated for more extensive planting.

The northern high bush type is grown commercially in parts of North Carolina, New Jersey, Mich., Mass. and some states farther north. The chief requirements for the northern type are an acid soil and a water table 16 inches below the surface during at least a part of the growing season. It is very difficult to grow this type in this section because of water requirements. It is hoped, however, that this difficulty can be surmounted by mulching with materials as saw dust, leaves, straw, or pine needles.

The southern type is more resistant to drought, consequently may be grown on drier soils than the northern type. The southern type is well adapted to many of the garden soils of the south. The pH. of much of the southern soils is ideal for the growing of blueberries. Most of the southern soils have a fair water supply which is sufficient to meet the needs of the southern type.

With the increasing interest in Victory gardens, there has been an increased interest in blueberries as an addition to the home garden. The northern type may find a place in some localities of the south, but generally conditions in most gardens are not conducive to its growth. Tests are being carried on at Clemson and other southern institutions in an attempt to find desirable varieties on the eastern markets.

The northern varieties sell for \$0.20 to \$0.50 per quart.

The rabbit-eye type of blueberries are grown quite extensively in parts of the South. There are very large plantings of this type in parts of Florida, and some few are grown in Georgia. This type of berry has been tried in South Carolina with considerable success. Some varieties of the rabbit-eye type are grown in south Georgia, but the low bush type seems to thrive best in western Georgia. The coastal section around Wilmington, N. C., is assuming importance as a producer of the northern high bush type.

As a food blueberries are excellent. They serve as a very good fresh fruit and are also excellent for cooking. They are also well adapted to canning and quick freezing.

# Engineering As Applied To Agriculture

By St. Clair Knight, '43

Engineering goes hand-in-hand with agriculture in mechanization.



Courtesy S. C. Extension Service

Proper and efficient motors increase farm income

The sciences of agriculture and engineering are rapidly being correlated and fused for the betterment and advancement of the farmer. Farming has, year by year, become more mechanized. The great necessity for further and improved mechanization has now presented itself due to the seriousness of the world situation.

The successful farm business must be efficient. Exactness and accuracy are not only desired but demanded. The engineer must be exact, accurate, and efficient. The business of farming being the largest and most important business on earth, must necessarily comply with these demands.

Recognizing the importance of following the practice and principles advocated by the agriculturist, there are four other fields in which engineering takes place. Great stress is placed on correlating these fields with sound agricultural principles. A knowledge of them, (1) Rural electrification, (2) Design of farm structures, (3) Soil conservation, (4) Motors and power machinery will lead to a really successful farm business.

With the creation of the R. E. A., new importance has been attached to the value of electricity on the farm. It is generally conceded that no profit can be realized by using electricity only for lighting the home. The farmer must make it work for him. This can and will increase labor efficiency and reduce the amount of physical labor required in all farm operations. All this is accomplished by the simple electric motor. Yet it is not as simply done as it may seem. Motors are designed for different jobs.

The load that is to be pulled must be carefully determined and the proper horse power of the motor can then be selected. The windings must be different on motors that pull varying loads than those that carry constant loads. It may be necessary to have a speed control rheostat in order to obtain the desired R. P. M.. As can be seen, a working knowledge of the mechanics of motors is necessary in selecting the most efficient and economical one for the job that is to be done. Electricity is also proving its place as a head medium for hot beds. Here it is essential to understand wiring and the operation of thermostats.

The importance of farm structures in the development of farm business is being widely recognized. It used to be so a farmer, if he needed a building, would just decide that he'd better put up something that would be called a barn. The economic soundness of this policy has now been displaced. Any structure should be planned to suit the various needs that it may be called upon to satisfy. In order to do this, a thorough knowledge of materials of construction must be known. The size must be carefully calculated for economic soundness. A sensible system of yearly repair must then be incorporated into the farming program to preserve these buildings. Proper maintenance will result in longer life and a decrease in the total yearly cost.

Soil conservation deals with the preservation of that most important natural resource, the top soil.

Continued on Page 24





# History Of The Department Of Agriculture

By J. L. Schaffer, '43

There were proposals as far back as the year 1776 that a Department of Agriculture be formed. George Washington, in his last annual message to the Congress said that a board of agriculture should be formed to collect and diffuse information and "by premiums and small pecuniary aids to encourage and assist a spirit of discovery and improvement". In the year of 1839 Congress appropriated \$1000 to collect agricultural statistics, conduct investigations, and to distribute seeds. It was with this money that the Agriculture Division of the Patent Office was organized. In 1860 the Republican Party was indebted to the west for its victory. President Lincoln called for the establishment of a agricultural and statistical bureau in his first message to Congress.

The Department of Agriculture was created on May 15, 1862. It did not at that time have a cabinet status. The first head of this department was Isaac Newton. In 1867 a museum was started and in 1881 a building was erected for that purpose. The first Division organized was the Chemistry Division which dealt with soils and fertilizers. It was set up in 1862. Next came the Entomology Division. It directed its efforts to combat insects that were injurious to agriculture. The Bureau of Animal Husbandry was set up in 1884 to save our meat export trade. At that time, many animals that were exported were diseased, and we realized unless something was done to stop this practice our market would be lost.

Land Grant Colleges were established as a result of the Morrill Act of 1862, and this has facilitated the dissemination of stores of Agricultural information. The first State agricultural experiment station was organized at Wesleyan University in Middletown, Conn., in 1875. In 1887, the Hatch Bill authorized a national system of agricultural experimentation. It was the first time in history that any nation had taken such a far sighted step.

In the year 1889, the Department of Agriculture was given a cabinet status. At the turn of the century, the home demonstration work was begun. In 1914 the Smith-Lever Act was passed which Congress offered to match State grants for extension work. In 1905, the Department assumed protection of our national forests, and a year later took over the enforcement of the Pure Food and Drugs Act.

The Smith-Hughes Vocational Educational act of 1917 provided for work in that field until to-day where it has taken on a major importance in teaching farmers the innumerable things they have to be acquainted with to make their enterprise successful.

On May 15 of this year we celebrate the eightieth anniversary of the founding of the Department of Agriculture. If we look back, we can see a job well

done. In so short a period, it is remarkable that they could have done so much for the farmer. The countless thousands of bulletins, reports, statistical data, pamphlets they have issued have been invaluable to the farmer of this country, as well as the rest of the world. They have met every problem squarely and have usually solved it as best as could be expected. This Department is almost completely free of politics. The majority of its members are energetic and conscientious workers who are seeking to better the lot of the farmers of our nation. Let us pause and salute the past and the present members, and let us all hope that the future of The Department of Agriculture will be as bright as the past. With such an excellent man as Claude Wickard at its helm, we need have little fears of its immediate future.

—THE AGRARIAN—

## DR. COOPER AND MR. E. G. GODBEY ATTEND CONFERENCE

Dr. H. P. Cooper, Dean of the School of Agriculture, and Mr. E. G. Godbey, associate animal husbandman, attended a pasture conference April 21. This conference was held at Quincy, Florida.





# FARM TIMBER AND NATIONAL DEFENSE

By D. C. Eaddy, Jr., '45

An army "Travels on its stomach," but a little study of our modern army requirements shows that wood is almost as essential as food.



Courtesy S. C. Experiment Station

It is profitable to sell the select trees for poles or piling

Much has been said and written about the tremendous loss in soil fertility that has occurred in the two centuries since our forefathers settled this United States of ours. Much of this loss of fertility is due to the wanton destruction of our forests by unscrupulous actions of turpentine stills, crosscutters and pulp-mills that could have been easily and far more profitably fed with crooked or otherwise deformed trees.

Success in livestock production owes a great deal to the construction of adequate fences which are of necessity supported largely by wooden posts of pine or locust. These posts, treated with creosote or solutions of copper sulphate, commonly known as bluestone, or zinc chloride will last almost indefinitely. There are 470,000,000 acres of land in the United States classified as forest land. It may be said that there are six advantages of practicing farm forestry:

1. It insures a constant production of timber.
2. It offers an effective barrier to soil erosion.
3. It is one of the best methods to control stream flow and to check flood conditions.
4. It provides cover and feed for the preservation of wild life.

5. It converts land unsuitable for agricultural purposes into profitable production.

4. It makes possible the profitable use of farm labor in periods in which other farm work is at low ebb.

An army "travels on its stomach", but a little study of our modern army requirements shows that wood is almost as essential as food. Gum and cottonwood are used for crating and boxing; oak is used for office furniture to conserve steel. Tanks are carefully encased in wooden cases for shipment. As much lumber is required in crating a bomber for shipment as is needed in building a 5 room house. The construction of a battleship requires 300,000 feet of lumber (largely Southern pine). Lumber is also used to pack shells for protection in shipment.

Our duty as timber raisers is to supply needed timber that is mature, straight-grained, and solid. We can do this without gutting our forests for a few paltry dollars. We must do our share to "keep 'em rolling" and "keep 'em flying", but we must do it conservatively so as to have some reserved national wealth when this conflict is over. Timber may be considered as a savings bank yielding a high percentage of compound interest. Submarines may sink our ships, but they can't sink our forests.





# BETWEEN THE

## **McGINTY MADE PROVINCIAL SECRETARY OF PHI KAPPA PHI**

Mr. R. A. McGinty, Vice-director of the Experiment Station, has been made Provincial Secretary of Phi Kappa Phi. Mr. McGinty replaces Dr. T. H. McHatton of the University of Georgia, who has been called into active duty in the United States Army.

—THE AGRARIAN—

## **BOMBING RANGE TO BE BUILT**

Plans are being formed to use a plot above Lake Issaqueena as a bombing range. The planes using this range will be based at the Greenville airport. The bombing will be about two miles square.

—THE AGRARIAN—

## **COLOSTRUM AND RECONSTITUTED SKIM-MILK USED AS A SUBSTITUTE FOR WHOLE MILK IN THE RATION OF DAIRY CALVES**

Colostrum, the secretion of the mammary glands of the cow immediately following the birth of the young, is considered almost indispensable to the newborn calf. It is undesirable for feeding older calves, and as a food for man. Hence, much of this product is discarded as waste. A combination of colostrum with skim milk, either reconstituted or fresh, results in a desirable substitute for whole milk in calf feeding. This practice makes it possible to market more whole milk.

—THE AGRARIAN—

## **DRIED WHEY A VALUABLE SUPPLEMENT IN CALF FEEDING**

Dried whey, a by-product in the cheese industry, has proved to be a valuable supplement in the ration of dairy calves. It is especially beneficial for calves that are in a general unthrifty state. The specific role of dried whey in correcting malady has not been established.

—THE AGRARIAN—

## **RIEGELDALE SALE AVERAGES \$647**

The Riegeldale Sale held on April fourth at Trion, Georgia, resulted in an average of \$647. Top animal, Douglaston Baroness Darling 538775, sold for \$8,800. Five others brought better than a thousand dollars. The sale was attended by Professor J. P. LaMaster, head of the Dairy Department, and Mr. Vance Henry, dairy specialist of the Extension Ser-

vice. The Riegeldale Herd is managed by Ralph W. Coarsey, a graduate of Clemson. While at Clemson he helped organize the Dairy Club. Before going to Riegeldale, Mr. Coarsey was county agent of Chester county and he is partly responsible for the fine Guernseys in Chester county.

—THE AGRARIAN—

## **DR. GILBERT H. COLLINGS TO ADDRESS PENDLETON FARMERS' SOCIETY**

The annual banquet of the Pendleton Farmer's Society will be held on the night of May sixth. Dr. Collings, president of the society, will give the principal address. This society is the fourth oldest Farmer's Society in the United States.

—THE AGRARIAN—

## **DR. FRANK MOSER TO ENTER THE ARMY**

Dr. Frank Moser is expected to be called into active duty with the army. He is a member of the Agronomy Department and is connected with the Experiment Station.

—THE AGRARIAN—

## **DR. A. E. PRINCE RECEIVES KRESS GRANT**

Dr. A. E. Prince of the Botany Department has received a grant from the Claude W. Kress research fund. He is to prepare a list of all fungi attacking crop plants, ornamental plants, and forest species in this section of the state.

—THE AGRARIAN—

## **GOODALE RECEIVES AGRARIAN KEY**

Professor Ben Goodale, of the dairying department, was presented with an Agrarian key at a recent meeting of the Agrarian Staff for his four years of service as faculty advisor of that organization.

Professor Goodale was the speaker at this meeting and made suggestions for the boys working in the journalistic field. He also gave a short history of the Agrarian magazine and brought out a few of its highlights.

—THE AGRARIAN—

## **AG. ENGINEER LEAVING**

Mr. Fagan of the Ag. Engineering Department has accepted a position at Oklahoma A. T. M. He will be head of the Ag. Engineering Department of that institution.



# FURROWS

## NEW MILK MARKETS

The Borden Milk Company has completed a milk plant in Chester and a receiving station in Newberry. The Chester plant will be able to handle a quarter of a million pounds per day. The Borden Company has invested \$300,000 for buildings and equipment in the plant and the receiving station. The Chester plant will furnish a market to the farmers of Chester county and parts of York, Lancaster, Fairfield, and Union counties. The Newberry receiving station will furnish a market to the farmers of Newberry county and parts of Laurens, Saluda, Lexington, and Richland counties. The farmers are not expected to go into the dairy business but to use this new market as an additional source of income. The cows will furnish a market for soil conservation crops raised on the farm. Some farmers in Chester county have doubled their income by taking advantage of this new milk market. This market will also help to distribute the farm labor over the entire year.

—THE AGRARIAN—

## FREE—A WAR-TIME GIFT TO THE NATION 1000 REGISTERED JERSEY BULLS

The Jersey breeders of America are giving away 1000 registered Jersey Bulls to the dairymen of America. These bulls have been selected from the finest blood lines of the World's Greatest Dairy Breed to be given to 1000 dairy farmers to improve the production, type and income of America's dairy herds. The bulls will be given away in August. Anybody interested in securing one of these bulls should write Jack Mesbit of the American Jersey Cattle Club, 324 West 23rd Street, New York, N. Y.

—THE AGRARIAN—

## S. C. GUERNSEY SALE HELD IN NEWBERRY

The State Guernsey sale was held May 5 at the Newberry County fair grounds. The sale, usually held in Columbia was moved to Newberry because of the facilities that are available in Newberry, and because the buildings in Columbia previously used were not available this year. Fifty head of registered Guernseys were sold. An outstanding young heifer, donated by one of our oldest and best breeders, Mr. G. A. Sherrill, Cheraw, S. C., to the Guernsey Milk Fund for Relief of British and Channel Island Children, was included in the sale.

## GRASS CAN HELP WIN THE WAR AND WRITE THE PEACE

In order that enough milk might be produced for national defense, every cow in the United States will have to increase one pint per day. This can be done by taking advantage of annual grazing crops. Grazing will also help the dairy farmers produce cheap milk. The dairy farmer is called upon to do his part in the defense of America.

—THE AGRARIAN—

## SOY BEANS USED TO IMPROVE QUALITY OF SILAGE

South Carolina dairymen are turning more and more to soybeans with corn and sorghum to improve quality of silage. The addition of soybeans to corn and sorghum increases the protein, mineral, and vitamin content of the silage. Figures from S. C. D. H. I. A. records show that in 1937 only 1.75 of the silage fed to D. H. I. A. herds in South Carolina was cane and soybeans or corn and soybeans; the remainder being straight corn, cane, or small grain silage. By 1940 the per cent of corn and cane in combination with soybeans increased to 33.3 per cent. The trend was increasing in the amount of silage fed per cow during this period.

—THE AGRARIAN—

## LaMASTER HONORED

Professor J. P. LaMaster, head of the Dairy Department, has been elected vice-chairman of the Dairy Science Section of the Association of Southern Agricultural Workers. He was elected at the annual meeting held in Memphis, Tennessee.

—THE AGRARIAN—

## SOIL SAVING TIP

The life of an inch of topsoil was increased from 2 years to 29 years by contoured strip cropping of a field with a 5-percent slope in a soil saving test carried on by the U. S. Department of Agriculture at its Blackland Station at Temple Texas. These conservation practices reduced the rate of soil erosion from 1-acre inch in 2 years to 1-acre inch in 29 years, and results have indicated that this reduced rate of erosion can be offset by building up the yielding ability of terraced land with a good rotation.

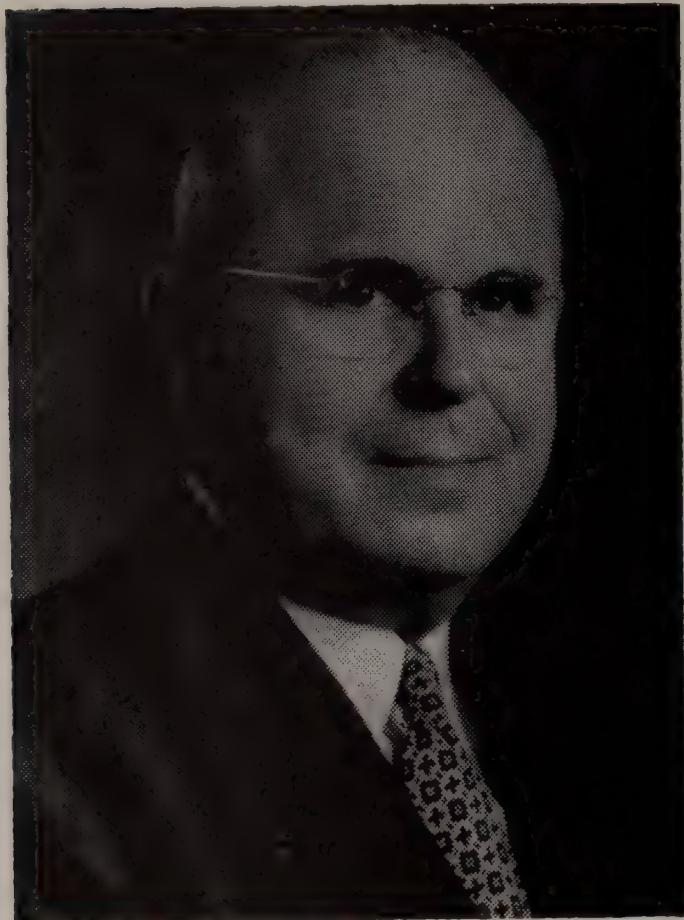




# THE AGRARIAN PRESENTS

BEN E. GOODALE

Professor . . . Organizer . . . Leader . . . Worker . . . Advisor



Ben E. Goodale, Associate Professor of Dairying

One does not have to go far on the Clemson Campus to meet and talk with people who have had interesting and sometimes extremely exciting experiences. Professor Goodale or "Big Ben," as he is affectionately known by Clemson men, is a man who has had a varied background and a life filled with activity worth knowing about.

Reared on a farm near Marshalltown, Iowa, Big Ben began his education in a one-room, one-teacher schoolhouse. Upon finishing grammar school, he completed his high schooling in Marshalltown.

Ben was vitally interested in dairying, so in the fall of 1916, he became a freshman majoring in Dairy Industry and Dairy Husbandry at the Iowa State College, Ames, Iowa. World War I intervened in 1917, so Ben became a member of the United States Armed Forces and off he went to Camp Crane, Allentown, Pennsylvania. After his training period, he was sent to Halifax, Nova Scotia, where he boarded the transport Baldic headed for Europe. When the Irish shores were barely visible, a German torpedo

found its mark and saundered a hole in the ship's side. All men took turns at pumping out the inpouring water, and the ship finally made its way in.

All of Ben's 21 World War months were spent in special service with the French army. Except for occasional leaves, most of this time was spent at the active front, where Ben took part in four major offensives. During one of these offenses, he was gassed but he managed to have a successful recovery. All of his leaves were spent in investigation and study of foreign dairying systems.

The war ended, the Armistice signed, and Big Ben came marching home with a French Croix de Guerre which he was awarded for his brave and brilliant service. In the fall of 1919 he resumed his education in dairy husbandry and dairy industry at Iowa State.

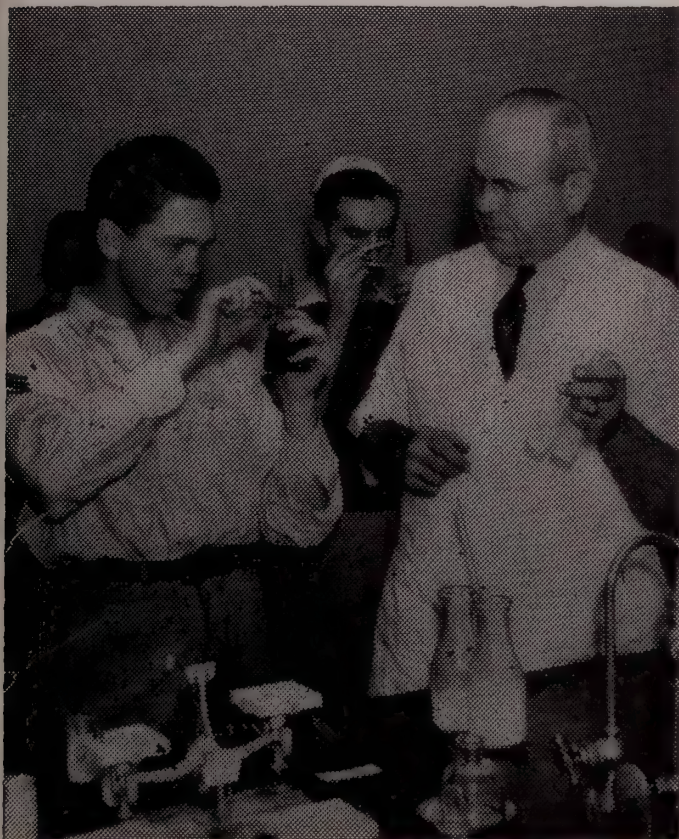
Ben was truly an enthusiastic worker all through his college career. Besides undertaking a double major, he was organizer and president of a cooperative buyers organization; president of the Public Speaking Council, Dairy Club, and Honorary Dramatic Masqued players; member of the student governing body called the Cardinal Guild, the Interfraternity Council, and the Tau Kappa Epsilon. He played football, but this does not conclude his college accomplishments; every expense item was earned by him. He worked at jobs which paid him as little as fifty cents per day.

Twenty years ago Professor Goodale became an Associate Professor in the Dairy Department at a then small school called Clemson Agricultural College. He liked it so well that he has never left since that time except for the summer months which have been spent in graduate work, as an extension worker for the Julius Rosenwald Foundation, and as a manager for commercial dairy plants. In 1929 he obtained his M. S. degree at Iowa State, Ames, Iowa. His thesis was entitled The Influence of Soybeans on Market Milk and Butter.

An article in itself could be devoted to Big Ben's campus activities, so we will merely tell here of some of the most important ones. His job as associate professor of dairying includes the business of managing the Clemson College Creamery, teaching elementary dairying and teaching dairy manufactures. He is faculty advisor of all agricultural and agricultural engineering freshmen.

Professor Goodale wears a number of keys across his chest which designate some of the local organizations he is affiliated with. These are: member of The Blue Key, Phi Eta Sigma, Tiger Brotherhood, Mu





Prof. Goodale checks a butterfat test.

Bea Psi; founder and faculty advisor of the Dairy Club; one of the faculty advisors of the Tiger, the Presbyterian Student Association, and The Agrarian. Along with Dr. Williams and a student, Harris Beach, Professor Goodale helped in organizing The Agrarian during the late fall of 1938. Big Ben is on the Clemson Y. M. C. A. advisory board, chairman of the advisory committee for the Senior Council, the Religious Emphasis Committee, one of whom organized and is on the advisory committee for the Honor System. He is chairman of publicity, ticket sales, and seating for the Concert Series, a member of the Danforth Fellowship Camp Scholarship Committee, and the only original member of the Vocational Agricultural Judging Committee. During his early years at Clemson he coached football for nine years, and he officiated at football games for ten years. He probably was under more head coaches than any other man coaching at Clemson, having been under four.

In the community of Clemson, Professor Goodale is a charter member and was three times president of Clemson's only civic group, The Fellowship Club. This club maintains a clinic which Big Ben founded, and he is now in complete charge of it. He is chairman of the Community Welfare Committee which works with the cadet corps and the Boy Scouts in getting and distributing Christmas baskets each year. He is Deacon and acting chairman of the Presbyterian Church.

Professor Goodale is a local member of the American Foreign Legion, and as many patriotic, defense minded people he is a member of the Pickens County Council for Defense and the Commander of the Calhoun-Clemson Citizens Defense Corps.

Professor Goodale's hobbies are obvious as seen by his numerous activities. Perhaps his greatest dislike is unpasteurized milk. His favorite sport is football. Most people will agree that he is a clever speaker, for his talks are filled with sly bits of humor as well as educational information. He is married and has a son, Gordon, studying Chemical Engineering here at Clemson.

When asked his opinion of The Agrarian he replied, "it is one of the greatest extra curricular activities in the Agricultural School, because it is a connecting link between schools, alumni, the faculty, and students." He believes that the Clemson Students are a grand group of men, and their equal cannot be found in any college.

The Clemson Cadets and the Clemson townspeople are deeply indebted to Professor "Big Ben" Goodale for his kind and thoughtful understanding in time of need, for his big smile and pleasing personality, and most of all, we owe him much for his loyalty and perpetual energy in all of his undertakings that have been so beneficial to us. We only hope that this article will be an inspiration to those of us who feel that we haven't the time to spend on an activity that would be helpful to our fellows.

Preferred

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RICHMOND, VIRGINIA





# CITY LOOKS AT THE FARM

By J. L. Schaffer, '43

Harmonious relations between rural and urban dwellers will make for nationwide Prosperity.

The economic conditions of the city are very dependent on conditions of the farmers. With specialization in industry greater than ever before, we are inclined to look at one industry, usually one we have some connection with, as one of great importance. The great diversity of the farm industry tends to make us forget that the farm industry is the basic industry of this and almost every nation.

The year before the free land of the United States was settled, there was a great interest in the rural section of this country by the city folk. The land always afforded them an opportunity to alleviate an economic pressure of the city. If things became too difficult, they could pack their meager belongings and go to the land that was waiting for them. Today all this free land is exhausted, and the city folk have lost some of the former interest they had. Their losing of interest has not been complete by any means. There are still many people who desire to go back to the farm, but the lack of suitable land does not permit them. This has caused a problem of major importance. There now is a heavy pressure of population on our land supply. This pressure is sure of increase many-fold with the successful completion of the present war.

The city looks to the farm as a source of manpower, and they are most interested in the welfare of this future labor. It must be realized that the rural areas educate and care for one-third of the nation's children, and they have to do this on less than ten percent of the national income. This causes the rural folk to be in poor health and poorly educated. When these people attain the age of maturity and come to the city, this problem then faces the urban and in most cases, the city can do little or nothing for these unfortunate farm folk. These people are not ready for the highly specialized jobs that the city is ready to offer and are forced to take common labor for which there is always a plentiful supply, except in emergencies as the present.

It may be surprising to say that city folk are very interested in soil erosion, not directly perhaps but indirectly, without doubt. As the soil is depleted, the amount of areable land is decreased. The demand of most crops are usually stable and when the supply goes down, the price naturally goes up proportionally. When prices go up they affect the city person and there is a great interest on their part why this has happened.

In times of rural unemployment, the city feels the repercussions. It usually takes the urban dollar to support these unemployed. In many cases, these

unemployed come to the city seeking employment. They offer competition to the urban laborers, and they are willing to take less wages than the city folk. This has caused widespread fear on the part of city labor that the standard of living will be forced down by a new supply of cheap labor.

In times of depression, the rural areas acted as a great shock absorber in two ways. Farm prices are the first to rise and great multitudes of the urban population can move out to farm areas. In poor times, it is the farm prices that fall first, and they fall further than manufactured goods.

These are but a few things that interest the people in the city in relation to farm folk. One can not draw a line of separation between rural and urban. They are dependent on one another in every way. What affects one is sure to affect the other in some way. The sooner the two work in complete harmony the sooner will our Country prosper. In the future, let all planning be done with rural and urban holding an equal place in arriving at the desired goal.



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THE  
SENECA  
JOURNAL

Seneca, South Carolina



# THEORY FOR AGRICULTURE

By M.O. Berry, '43

Theory is the foundation of an achievements as it is notably observed in the breeding of hybrids and in the development of farm machinery



Courtesy S. C. Experiment Station

Cutting corn at the rate of .87 acres per hour.

How many of you have read this article believe in theory as a basis for agriculture? Chances are that only about twenty-five percent of you would consider theory at all. Yet, how else did the art of agriculture have its beginning but in theory? Someone at first had an idea that it would be better to grow plants for food rather than depend wholly on Mother Nature. This was pure theory at the beginning for cultivation of crops had never been attempted before, and so it remained until actually carried out.

Practically all of our present forms of agriculture are based on theories, but they have since become practical applications that are suited to everyday farm use. This fact leads us to what is important to all agriculturists at this time—results are what count and they can be attained most rapidly now through the use of established farm practices; but advancement in the methods of farming to be used in the future, improvements over existing plant breeds and farm implements, and the extensive application of electrical power to faster and more economical farm production must be accomplished to meet the evergrowing demand for food and raw materials secured from the farm. Theory will have to be the foundation for such achievements as it has notably been in the breeding of hybrids and in the development of the family size farm machinery units for the south.

Theory is usually thought of as stated facts that have been calculated experimentally with laboratory research as the background for calculations. How, then, are you to use theory in your farm program? Read published data about your soil types, find out why certain fertilizers and machines are recom-

mended for your part of the state, ask your R. E. A. supervisor how to use electricity to the greatest advantage on your farm. Your county agent has been taught the why and wherefore of suiting crops to soil conditions, the economics of farm operations, and the practical utilization of location and marketing facilities. He knows the theory; most of it is the result of experiments carried out under your local conditions. Get it from him and use these facts to help you profit.

However, theory is not limited to printed matter or the book learning of an individual who has studied agriculture but broadens out to take in the ideas of the farm operator himself, for an idea is usually a result of theoretical reasoning based on past occurrences. If theory is to be utilized in advancing agriculture, every farmer must put his ideas to a test to eliminate the poorer quality materials and methods with which he has been acquainted.

The primary purpose of this article is to get you to use your knowledge for the improvement of farm machinery. All of you farmers of this state have a variety of undeveloped ideas concerning needed changes in the design of present farm equipment. The manufacturers produce implements that have been tested, but there are always better arrangements for power machinery to gain more efficient and more accurate operation.

If you want to secure the latest theories regarding modern farming, write to the experiment station here at Clemson or ask your local agricultural teacher to procure the information for you. Particularly

Continued on Page 22





# Experimental Facilities



Hog Barn  
at  
Clemson College

Courtesy S. C. Experiment Station

Agronomy  
Field Laboratory



Courtesy S. C. Experiment Station



Greenhouse  
and  
Workroom

Courtesy S. C. Experiment Station

# Experimental Activities



Breeding Work with turkeys is being carried on now at Clemson.

Courtesy S. C. Extension Service

S. C. Farmers are being assisted in improving their yields and quality of hay.



Courtesy S. C. Extension Service



Courtesy S. C. Experiment Station

"Sham Feeding" experimental calves



# GONE WITH THE RIVER...

By E. P. Huguenin, '42



The program of reforestation of idle and eroded land is making rapid progress in the state. This is an excellent method of retarding erosion.



The Soil Conservation program includes the construction of complete waterways and the adoption of a complete program of land use on each farm.

Courtesy S. C. Extension Service

Hordes of gullies now remind us  
We should build our lands to stay,  
And, in parting, leave behind us,  
Fields that have not washed away;  
When our boys assume the mortgage  
On the land that's had our toil,  
They'll not have to ask the question  
"Here's the land, but where's the soil?"

T. V. A.

South Carolina farmers either through ignorance or indifference are guilty of one of the most disgraceful exhibitions of careless waste in the history of the South. Starting off with some of the poorest land in the country we have allowed practically all of the best of this, the topsoil, to wash away. The Seneca and Saluda rivers aren't red from choice, their tomato juice color is nothing more than dissolved farms on their way to the sea. The great pity is that the ones who should be most concerned about this appalling waste, give it little thought and do still less about it.

With government workers literally begging the farmers to allow them to take a part in the fight against this insidious thief, they receive little help and almost no encouragement.

In our United States the problem is greater than in South Africa where, according to General J. G. Smith, "Erosion is one of the biggest problems confronting the country, bigger than any politics." Since the start of the present conflict erosion takes a back seat to our "all out" effort, but its importance is still as great as before. A nation can eke out a bare existence if they lack iron, coal, or some other neces-



Courtesy S. C. Extension Service

sity, but fertile soil cannot be bought—it has to be built. Where erosion is present in large amounts fertile soil is noticeable by its complete absence.

The extinction of a nation by erosion is not an improbability that may occur at some future date, it has occurred in the past and doubtless will again.

South Carolina farmers, you must wake up to the fact that fertile soil is never eroded soil and fertile soil is the same thing as money in the bank, an enjoyment as well as a constant source of supply.

**VOLUNTARILY ENLIST IN THIS FIGHT BEFORE COMPULSORY MEASURES ARE TAKEN.**



# ABOUT THIS AND THAT

By The Editors



## Lost \$3,075,000

Hats off to the wily fertilizer salesman! To him goes a great deal of credit for keeping the farm income in South Carolina hovering around the \$240 mark. But he must share his glory with those agriculture workers who have made for themselves a cloak of negligence. This combination of salesmanship and lack of teaching has caused farmers in this state to pay as high as thirty or forty cents out of each fertilizer dollar for unneeded bagging and transportation of sand in the last few years.

To prove the point, let's look at some pertinent figures that can easily prove to any intelligent farmer that he is paying dearly for using low analysis fertilizers. Of each dollar spent for a 3-6-6, fifty-one cents goes for manufacturing, packing and distributing the goods while forty-nine cents pays for the ingredients. In the case of high analysis fertilizer, say an 8-16-16, only twenty cents of each dollar goes for manufacturing, packing and distributing and thirty-nine cents for the ingredients. A change from 3-6-6 to 8-16-16 would therefore save the farmer forty-one cents out of each dollar spent for fertilizer. In substituting the 8-16-16, the farmer would find it necessary to use only about one-third the amount used when 3-6-6 was applied to get the same amount of plant food. This would in turn release for war purposes many boxcars and trucks since only one truck would be needed where three were used before.

Perhaps forty-one cents doesn't look very impressive, but when placed on a statewide basis it assumes enormous proportions. Of the 400,000 tons of fertilizer sold in South Carolina in 1941, approximately fifty per cent was sixteen unit grade and seventy-five percent was of eighteen units or less. Assuming that the average price per ton was twenty-five dollars, South Carolina farmers lost \$3,075,000 by not using the 8-16-16. Three million dollars is ten per cent of the entire income of the State of South Carolina from tax sources.

But the loss sustained by our farmers does not end at \$3,075,000, because our cotton yield is 231 pounds per acre, corn returns only 13.3 bushels and our bony cows inhale dust in grassless pastures. These figures are ten year averages and serve to indicate how much money South Carolina farmers are NOT making. It can be made, because one to two bales per acre of cotton are not uncommon in this state and only last year a national corn yield record was established in Lexington county. Lush green pastures and bulging siloes in some sections of the state prove that good pasturage and silage can be grown.

Of course, the fertilizer salesman has not pushed high analysis goods—but neither has the majority of state-paid workers in agriculture. Only through increased efforts on the part of the latter can the South Carolina farmer save himself \$3,075,000. These figures must be put before the farmer. Teachers, county agents, other agricultural workers—GET ON YOUR JOB!

S. K. A.

—THE AGRARIAN—

## SHORTAGE OF PROFESSORS

The expectation of an increase in demand and a limited supply of college instructors and research workers has come to reality. The limited number of professors is fully felt this semester and will probably be felt even greater next year as the selective service boards continue to call men in the armed forces.

In one of the departments in the school of agriculture here at Clemson, there are only two professors left in the department, and both are expected to be called this summer. One can readily see that such cases are going to cause major adjustments in the faculty for the next coming school year.

We are very fortunate in the school of agriculture that many of the research workers of the experiment station and the extension service are capable of assuming the vacancies left by the professors. Many of the men are employed both as an instructor by the college and as research workers by the experiment station. If a necessity arises under such a system, the research men can devote their entire time as instructors.

Rather than let any of the departments become vacated, the most capable senior students could be secured to do part time teaching. We may rest assured that when school begins next fall there will be a sufficient number of instructors here to teach us.

C. B. F.

—THE AGRARIAN—

## SENSE OR SILENCE

It is a fundamental fact that words can help and conversely they can hurt. Hardly a day goes by that most of us speak thoughtlessly and often utter words of a harmful nature to our "buddies." It is an easy task to be sorry, but does being sorry heal the hurt?

Let us reverse our carefree habits. It is no simple matter to change overnight, but aren't men capable enough to evaluate their thoughts and express them in a beneficial fashion?

Most men hunger for recognition and popularity of the right sort. Saying no mean words and complimenting others may help. Why not begin now to give this thought a trial.

C. A. J., III.



## 14 Points for Victory

1. Have "Victory" Bonds and not "Defense" Bonds.
2. Build "War Production" houses, not "Defense" houses.
3. "Produce" and not waste time talking about "hours" and "profits."
4. Start an "Offense" and not always be on the "Defense."
5. Have a "positive" program, not a "passive" one.
6. Start "hating" Hitler and Hirohito and not "make fun" of them.
7. Sing "fighting" songs and ignore "boogie-woogie."
8. Know what we are fighting "for", not what we are fighting "against."
9. Spread the doctrine of Americanism to "other" shores, and not only try to keep Hitlerism "from" our shores.
10. "Avenge" Pearl Harbor, not just "remember" it.
11. "Take" Berlin, "bomb" Tokyo, "burn" Rome, not "wait" for token bombings here.
12. "Sacrifice," not just give what we can easily spare.
13. Get "fighting mad" and not remain indifferent.
14. "Win" the war quickly!

E. P. H.

—THE AGRARIAN—

### THE VALUE OF FORAGE CROPS IN THE PRODUCTION OF HOGS

Continued from Page 6

than do those confined to dry lot, other conditions being the same; forage crops help to produce more economical pork, for it cuts the protein supplement in half; pigs feeding on forage help to enrich the soil, for the land receives the full benefit of the droppings; pigs which have been on forage during the summer do much better and gain more rapidly during the winter when on dry lot; and finally and most important, forage crops mean improved sanitary conditions for the pigs.

—THE AGRARIAN—

### THEORY FOR AGRICULTURE

Continued from Page 17

should new ideas in power farming be obtained because of the recent developments in design for planting and harvesting equipment.

Practicality has its rightful place in farming, and those men who have used theory with their acquired knowledge have advanced faster and farther in the change from animal to mechanical power to lighten farm work and to secure a greater net return over labor cost. Why not let the theoretical ideas help you?

**GUARD YOUR CORN**  
WITH THIS **DOUBLE-ACTING**  
**SEED TREATMENT!**

SEMESAN JR. works *two ways*—by *contact* and effective *vapor action*—to kill certain seed-borne and soil-borne corn disease organisms. Purchased in 1-lb. size, costs only 7¢ per bushel of seed. Generally saves seed by reducing seed rotting, seedling blights; permits earlier planting; has increased average yield 4 bushels an acre in 9-year tests in Iowa. Wear dry mask when treating. Ask dealer for free Corn Pamphlet or write Bayer-Semesan Co., Wilmington, Del.



the original organic mercury  
**SEED DISINFECTANTS**  
A TREATMENT FOR EVERY MAJOR CROP



*Clemson College*  
*Laundry*



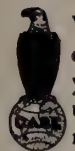
# YOUTH *Gets a Break* Plowmen *Get a Lift*



Kin to Ralph Waldo Emerson was another Ralph Emerson. Son of a clergyman and brother to a professor of Greek who helped found Beloit College, he fell heir to much that was mental, less that was material. At Andover, where his father taught theology in the Seminary, Ralph herded cows for the professors, taught a term of country school. Following his brother to Beloit he got a job as bookkeeper, soon became partner in a small hardware business at Rockford, then junior partner in a reaper-building enterprise.

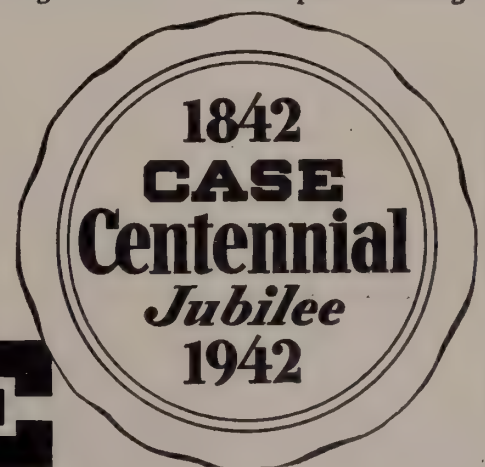
Suddenly the head of the business died. The panic of 1857 froze the firm's assets. At the age of 26 Ralph bore the burden of managing a business with nearly half a million dollars of debts. Spurning easy escape by assignment, he won the co-operation of creditors, kept on building reapers, harvesters, cotton cultivators, more and more kinds of tools to make life better on the farm. And then, in the fullness of years and of vision, he received kindly an inventor whose plan for improving plows had been rejected by the big plow-makers. It was the Emerson foot-lift that made play of handling the heaviest plows of the horse-drawn era, the last great event in tillage before the dawn of power farming.

## The American Way of Life Still Offers Youth Opportunity



With the foot-lift, riding plows became really practical. Farmers found their work faster and easier, all because . . . forty years before . . . the American system of free enterprise and unfettered opportunity had given a break to an obscure boy named Ralph Emerson. His firm, grown great and become the Emerson-Brantingham Company, finally was joined with the J. I. Case Co., bringing to Case the most modern, most efficient plow-building plant anywhere in the world.

Each year this business gives a break to young men fitted by temperament and training to create, build and sell better farm equipment. To many more it gives a break by furnishing them power and machines to make their farming easier, faster, more effective, more economical. For a hundred years Case has stood with youth on the principle that the better man, the better method, and the better machine shall have their chance. In the preservation of that principle is both the future opportunity and the present problem of youth in America. J. I. Case Co., Racine, Wis.



# CASE





## ENGINEERING AS APPLIED TO AGRICULTURE

Continued from Page 9

The soil loss in the United States each year is enormous. Few realized that it requires 100 years for nature to replace one inch of top soil. If there is anything that we must not lose, it is this precious soil. The A.A.A. in cooperation with the Soil Conservation Service has been emphasizing the importance of proper methods of control. Systems of terracing and drainage vary with the soil type, percent slope, and the general physical condition of the soil. For the masses of farmers to set up the proper and necessary required control measures, they must know their local soil type. They must know how to calculate and determine the slope. Finally, they should understand the laying out of terraces and drainage systems. In order to lay out a terrace, one must be able to operate a transit or a dumpy level. A thorough knowledge of contour mapping is essential. Each year we can see these surveys take on added importance.

In the field of motors and power machinery, we see all the principles of good engineering being applied on the farm. Mechanization must go hand-in-hand with these principles. Power machinery as combines, ensilage cutters, and corn harvesters is an assembly of intricate mechanisms operating as a unit for the same function. A detailed knowledge of the operation of these machines is essential for their proper functioning. For instance, the amount of air necessary to clean oats in a combine is different from the amount required to clean lespedeza. The cylinder speed is different, and the space between the cylinder bars and concaves also varies. These adjustments must be made before attempting to harvest any particular crop.

The maintenance of tractor motors and stationary gas engines is another major requirement of a good farm operator. Motors are a complex unit which requires constant care. Even though motors' never get tired, so to speak, is no excuse for mistreatment. This line of thought reveals some of the most infallible reasoning that can be attributed to mechanization. For anything to function properly, be it plant, animal, or machine, all the limiting factors have to be overcome.

### THE ANIMAL HUSBANDRY DEPARTMENT of CLEMSON COLLEGE

Purebred

Berkshire Swine  
Polled Hereford Cattle  
Hampshire and Southdown Sheep

### PROTECT YOUR PEACH CROP

—with—

## PAN PEACH SPRAY

PAN contains all the necessary ingredients to assure maximum protection.

### SIMPLE TO USE

PAN is used at the rate of 8 pounds to 50 gallons of water and is put up in convenient units:— Cases of 4-8 lb. bags, cases of 2-16 lb. bags and cases of 4-16 lb. bags.

Leading peach growers throughout the country find PAN PEACH SPRAY the best answer to their spraying problems.

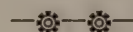


## The J. W. Woolfolk, Ltd.

MANUFACTURERS

Fort Valley,

Georgia



## THE CLEMSON COLLEGE

# SUMMER SCHOOL

## OPENS JUNE 1





# THERE'S A

# BOMB

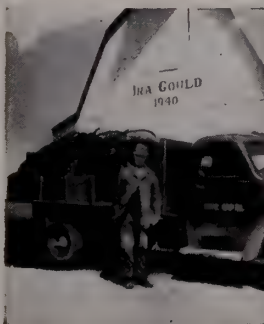
# IN YOUR BARNYARD



## CHILDREN UNDERSTAND— AND ACT!

Out in Oklahoma a Harvester dealer named Will H. Ford got word to the rural schools that Uncle Sam needs scrap metal now. Today in Will Ford's county 8,000 school children in 57 schools are busy as beavers. In the first three weeks they have dug up 647 TONS of "scrap to slap the Japs." Enough from one county to build a fleet of 36 medium tanks!

Champion "scraper" of the primary department at Velma School is eight-year-old Wanda Ely who hunted up 352 pounds of old metal, "all by herself," and brought it to school in her arms.



## "SEND THIS SCRAP TO THE JAPS— WITH POWDER BEHIND IT!"

With these explosive words to an International Harvester dealer, Ira Gould, 80-year-old farmer of Bone Gap, Illinois, sent his scrap metal off to war. If every farmer in the United States will follow Mr. Gould's patriotic example and get rid of his scrap at once, this country will take a tremendous stride toward winning the war.

**IT'S A DUD, NOW.** Just a pile of junk. It's **YOUR SCRAP METAL!** Rusting away and no earthly good to you *or to the courageous men fighting this war.* They need it. Their lives depend on it. *Your lives depend on it. Let Uncle Sam load this bomb for you!*

Scrap metal makes munitions. A one-ton bomb requires 500 pounds of it. A 75-mm. howitzer takes half a ton. *And the mills are not getting enough scrap metal to maintain the steel production demanded by war industry.*

By far the biggest pile of scrap metal left in America is on farms. Three million tons of it or more. And it's going to take every pound of this scrap to win this war. That's why it's up to you to collect all your scrap and get it moving before you do anything else. It may take a day or two of your time, but until it's done, *there is nothing you can possibly do that's more important.*

## The Harvester Dealer Will Help You

Because this job is big, and scrap is tough to handle, International Harvester, in cooperation with the Government, has asked every one of its dealers to lend a hand. And they are doing an immense salv-

age job. In towns where there is no junk yard, Harvester dealers have set up collection points. They are accumulating piles of scrap from farms—selling these piles to scrap dealers—and turning the entire proceeds back to the farmers who bring in the scrap. Harvester dealers are not taking a penny of pay for their part in the transaction.

In other towns where there are junk yards, Harvester dealers organize drives to get metal moving directly from farms to scrap dealers where it can be broken down, sorted, and segregated for the mills.

In all this work these men have only one goal—to *get all the scrap metal from all the farms moving to the mills.* The pictures show some of the ways they are getting this job done.

Get your own scrap together now. Comb your attic, fields and fence corners for old metal. Be sure that it's *all scrap* and contains no valuable parts or equipment you may need later. Then call on your Harvester dealer for advice on the best way to *send it off to be loaded for war!*

## INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue

Chicago, Illinois



## WHEN EVERYBODY WORKS YOU CAN BUILD A SCRAP IRON MOUNTAIN!

Down in Missouri, ninety-seven farmers have been hard at it at the urgent request of Harvester dealer George J. Seeger, of Creve Coeur. In one big day they loaded all the scrap they could find and brought it to town. It was weighed at a local elevator and George Seeger gave each

man a receipt for his tonnage. As the junk from this 190-ton pile is sold to scrap dealers—at prices far above what it would bring on the farms—all proceeds are turned back to the men who brought it in. Many take payment in War Savings Stamps and Bonds.



## RECEIPTS—GOOD FOR CASH

When Harvester dealers set up scrap depots, they give farmers receipts for every pound of metal brought in. When the scrap is sold, these receipts are redeemed in full in cash or War Savings Stamps. Dealers charge no commission.



## PRIZE MONEY— FOR BOYS AND GIRLS

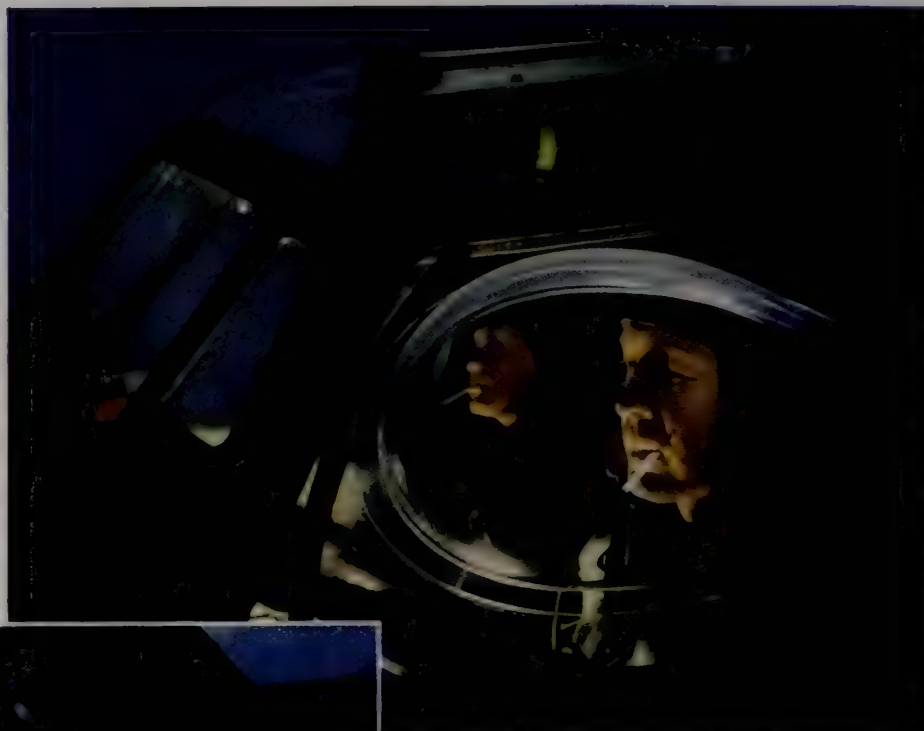
To stir up enthusiasm and get everybody working, Harvester dealers in various places offer prizes to the 4-H Club member or Future Farmer who gets in the biggest load of scrap during a drive.

# INTERNATIONAL HARVESTER



# YOU WANT STEADY NERVES

when you're  
flying Uncle Sam's  
bombers across  
the ocean



WITH THESE MEN WHO FLY BOMBERS, it's Camels all the time. The co-pilot of this crew (name censored), (*second from left, above*) says: "I found Camels a milder, better smoke for me in every way. And that grand flavor never wears out its welcome." Yes, in times like these when there's added tension and strain for everyone, steady smokers stick to Camels—the cigarette with less nicotine in the smoke.

## FIRST IN THE SERVICE—

The favorite cigarette with men in the Army, the Navy, the Marines, and the Coast Guard is Camel. (Based on actual sales records in Post Exchanges, Sales Commissaries, Ship's Service Stores, Ship's Stores, and Canteens.)

—AND THE FAVORITE AT HOME!

GERMANS OR JAPS, storms or ice . . . you've got to be ready for anything when you're flying the big bombers across the ocean to the battle-front. You bet you want steady nerves. These two veterans above are Camel smokers. (Names censored by Bomber Ferry Command.) The captain (*nearest camera*), a Tennessean, says: "I smoke a lot in this job. I stick to Camels. There's less nicotine in the smoke. And Camels taste great!"

STEADY SMOKERS STICK TO

# CAMELS

There's LESS NICOTINE  
in the smoke

The smoke of slower-burning Camels contains 28% less nicotine than the average of the 4 other largest-selling brands tested—less than any of them—according to independent scientific tests of the smoke itself!

R. J. Reynolds Tobacco Company  
Winston-Salem, North Carolina

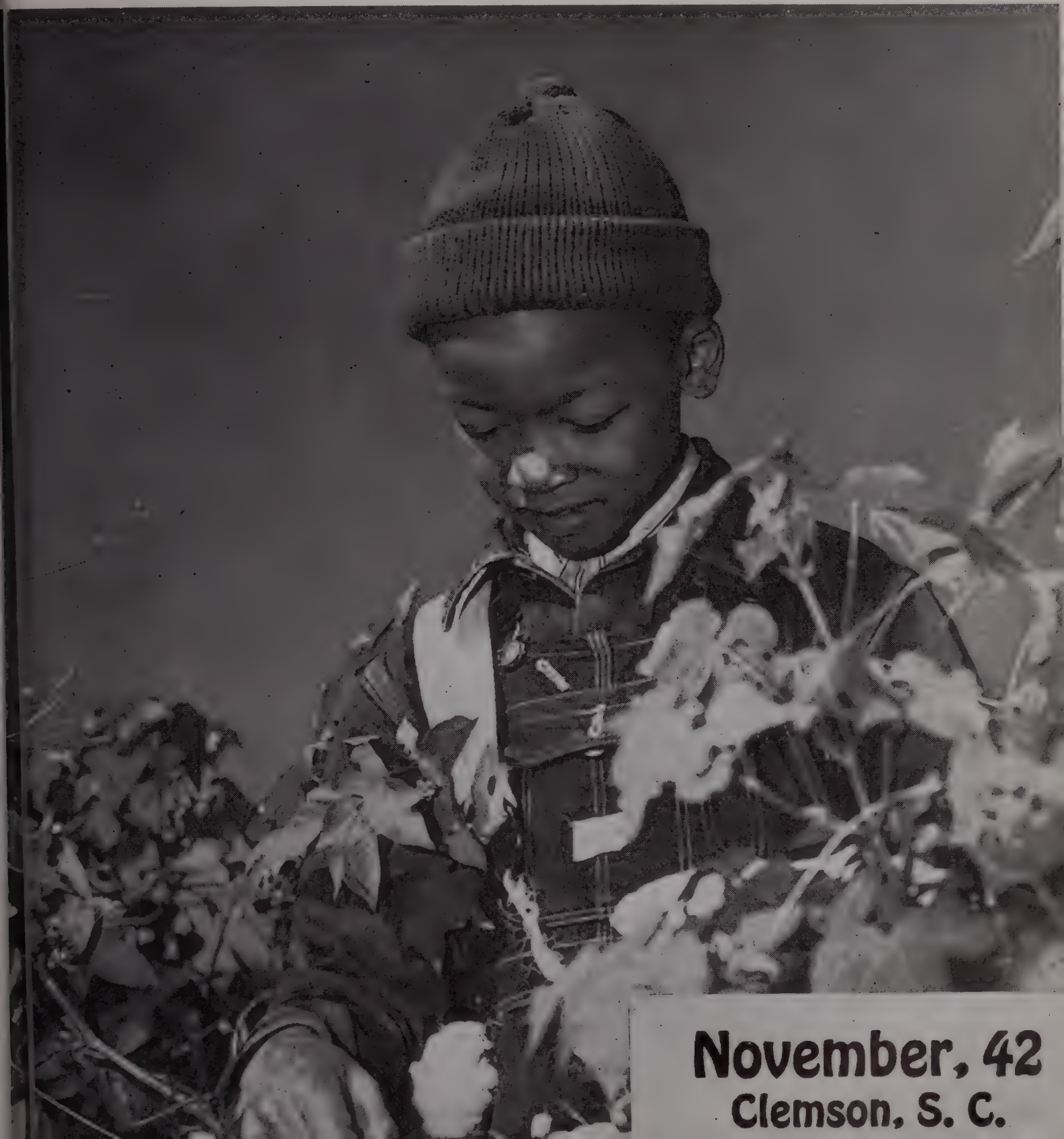
IN MY NEW  
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SMOKE IS IMPORTANT  
TO ME. I STICK  
TO CAMELS



# *The* **Agrarian**

OFFICIAL STUDENT PUBLICATION

THE CLEMSON AGRICULTURAL COLLEGE



**November, 42**  
**Clemson, S. C.**

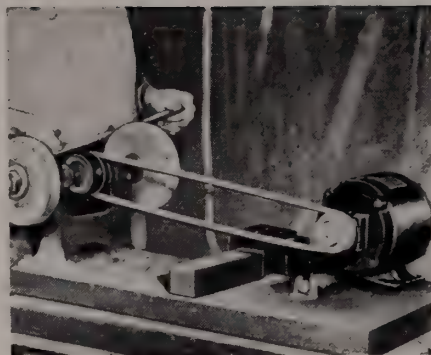


## Know all the farm jobs an electric motor will do

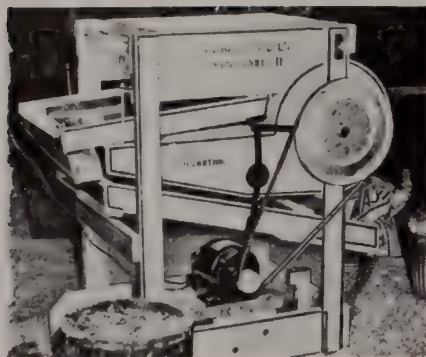
FARMS *MUST PRODUCE* more food. Farmers *must* get along with less help. That's the wartime situation you who are now in agricultural college should be able to help farms and farmers meet.

One good way to meet this situation is to apply an electric motor to as many jobs as possible. There are more than 35 farm jobs electric motors will do—eight of them are pictured on this page.

The first four jobs can be done by a small, fractional h. p. motor. The last four make use of a larger motor. Look at them. See how much work a motor can do on the farm.



**FARM SHOP EQUIPMENT.** A farmer can apply a small motor to a drill press, then to an emery wheel. It speeds up repair work tremendously.



**FANNING MILL.** With the electric motor and its constant speed, you get cleaner and more uniform seed.



**CHURN.** An electric motor does the churning while the farmer gets other work done.



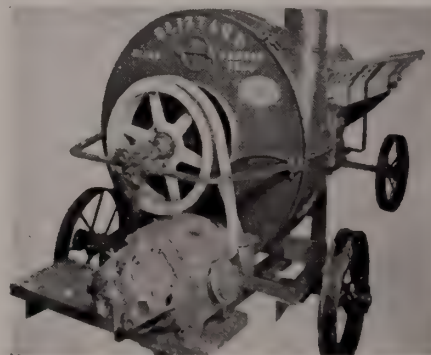
**FRUIT GRADER.** It takes very little time to apply a motor to one machine after the other.



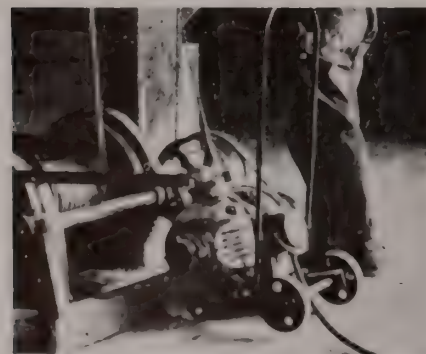
**CORN SHELLER.** With a 2 h. p. motor to help, a wagon load of corn can be shelled in an hour.



**FEED GRINDER.** No need for the farmer to drive to town to have his feed ground. A motor and feed grinder save time—wasting trips and money, too.



**ENSILAGE CUTTER.** With a 5 or 7½ h.p. motor, a silo can be filled using the ordinary help on the farm, at a cost of 1 kwh per ton.



**HAY HOIST.** Only one man and a motor are needed, to hoist hay.

### LEARN HOW TO CHANGE MOTORS EASILY FROM JOB TO JOB

THE FREE BULLETIN, "Farm Motors," shows how to make portable both small and large motors. A portable motor can be applied to one job after another, in a few minutes. "Farm Motors" contains facts on motor types, motor controls, motor care. It also gives ways to use a motor in every branch of farming. This bulletin will make a helpful reference book for your courses—and an invaluable handbook you'll be able to use many times after you graduate. Send for it today. Address Rural Electrification,

Westinghouse Electric & Manufacturing Co., 306 4th Avenue, Pittsburgh, Pa.

Note: Farm Shop Equipment, Churn, and Fanning Mill can be run by Split Phase Motor, of ¼ or ½ h.p. Fruit Grader needs Capacitor or Repulsion-Induction Motor, ¼ to 1 h.p.

Corn Sheller uses 2 h.p. motor; Feed Grinder, 1½ to 5 h.p. motor; Ensilage Cutter, 5 or 7½ h.p. motor; Hay Hoist, 3 to 5 h.p. motor.



Westinghouse

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OF AGRICULTURE

# The Agrarian

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No. 1

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## OUR COVER

Our cover picture well represents a fall scene in the South. The photo was taken in one of the fields of the South Carolina Experiment Station by Mr. Smith, Extension Service photographer.

Most South Carolina farmers have cotton as their chief cash crop. The gross income from lint and seed represents approximately 50% of the gross value of all products sold, traded, or consumed on the farm. Cotton occupies a prominent position in the farm set-up because cotton possesses a high specific value and a low cost of production. Highest yields are obtained by farmers in the counties of the upper Piedmont and the upper Coastal Plains.

South Carolina's cotton crop has been forecast at 735,000 bales on the basis of normal conditions. This forecast is compared with 406,000 bales made last year, 966,000 in 1940, and the 10-year average (1931-40) of 820,000 bales. The harvest acreage this year in S. C. is 1,227,000 acres with an indicated yield of 287 pounds of lint to the acre compared with 166 pounds last year.

## ACKNOWLEDGEMENT

The idea was suggested that The Agrarian enough to inherit a debt which nearly withheld further publication of the magazine. Everyone of the Clemson Agricultural and Agricultural Education organizations were approached on this matter. The following clubs contributed: Alpha Zeta, the Dairy Club, Kappa Alpha Sigma and Alpha Tau Alpha.

The idea was suggested that The Agrarian should have a subscription list. The executive and advisory staffs were against this proposition because The Agrarian is unique in that it is, perhaps, the only college agricultural magazine that is distributed free in the United States.

We of the staff of The Agrarian wish to extend our deepest gratitude to those organizations who have contributed and those who will contribute to help keep this magazine going with all of its tradition.

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## THE SENECA JOURNAL

Seneca, South Carolina

## DRINK MILK



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*Enjoy : : Ice Cream*



Clemson Dairy Dept.

*Compliments Of*

# L. C. Martin Drug Company

P. S. McCULLUM, Owner

OFFICIAL COLLEGE BOOK AND SUPPLY STORE

CLEMSON COLLEGE ▼ SOUTH CAROLINA

# Agriculture's Place . . . IN THE WAR EFFORT

Guest Editorial . . . By Dr. H. P. Cooper

The agriculture of this country is now on a war basis. The American farmers are being called upon for the greatest production in history. More food, oil, and fiber crops are needed to meet the present needs. With a large proportion of the farm workers entering the armed forces, factories and other war enterprises, a heavy responsibility rests upon those remaining in agricultural production.

During the first World War, farmers were asked to produce more of the staple crops, such as wheat, corn, and cotton, which called for an expansion of the old enterprises rather than developing many new enterprises. Today farmers are being asked to produce more milk, meat, poultry products, vegetables, peanuts, soybeans and many other products which often require more farm labor than is readily available.

The manufacture of farm machinery and equipment will be greatly reduced, and it will be necessary to take good care of and make the widest use of existing facilities. The production of new equipment in 1943 may be more than 20 per cent of average production for the past few years. It is planned to increase the output of farm equipment repair parts to around 130 per cent of normal production. These additional repair parts will make it possible to get greater efficiency out of the equipment now on the farm.

The shortage of fertilizer nitrogen is one of the most serious deficiencies confronting the Southern farmers. The soil climatic conditions existing in this region have favored the use of chemical nitrogen, rather than the following crop rotation practices which accumulate atmospheric nitrogen in the soils. Without chemical nitrogen it will not be possible to produce profitable yields of many of our staple field crops. The yields of small grain will be particularly affected by the nitrogen shortage. It is highly desirable that special effort be made to make nitrogen available in time for the small grain crops. Last year much of the nitrogen was not available early enough for maximum efficiency. In many instances farmers did not receive their nitrogen supply in time to apply to the crops grown.

The critical shortage of fertilizer nitrogen emphasizes the necessity of growing more and better legume crops. The increase in legume crops call for a corresponding increase in the use of lime materials. As the Southern farmer has not included the addition of lime to the soil as a common production practice, many of the soils have become strongly acid and will not produce profitable legume crops until the excess soil acidity is neutralized with lime.

The War Production goals call for a large increase in the production of peanuts and soybeans.



Dr. H. P. Cooper, Dean of The School of Agriculture

Since these crops do not grow best on strongly acid soils, it is not probable that profitable yields will be secured on the soils that have not received applications of lime. Farmers who expect to grow such high oil content plants as peanuts and soybeans will find that the addition of lime to the soil will generally be very profitable. One of the most needed developments in the Southeastern agricultural program is systematic applications of lime in the crop rotation system. The War Production goals may be an important factor in increasing the efficiency of farm activities and in establishing new and desirable practices.

The high cost of labor and the price ceiling on farm commodities is going to make it difficult and in many instances impossible for individuals and groups of farmers to meet War Production goals. This will be particularly true in regions where new industrial plants are paying high wages and are depleting the supply of farm labor.

Regardless of the existing deficiencies and new demands such as changed demands for farm commodities, machinery, fertilizer, and labor shortages,

Continued on page 11





# DEHYDRATED FOODS

C. H. Brown, '43

*Dehydrated foods facilitate more space for shipment over there*



By dehydration, a bushel of apples, as shown in the picture, can be reduced to 5 pounds and packed in moisture-proof, airtight bags, such as the three above.

Dehydrated foods implies mechanical circulation of artificial heat, or as more definitely defined by Processed Standardization and Inspection Division of Agriculture Marketing Administration, "a food product in which the major portion of the moisture has been removed by artificially produced heat under controlled conditions to the extent that preservation of the product is assured."

Part of our army's vast shipments of supplies to our boys in Australia and other points overseas contains millions of pounds of dehydrated foods especially vegetables. A short while ago Quartermaster purchases of 18 million pounds of seven of our "Bulk" vegetables, (potatoes, sweet potatoes, onions, carrots, cabbages, beets and rutabagas), with more to follow was announced.

Dried foods are in more concentrated form than foods preserved in any other way, and at the same time, they are less costly to produce and require less storage space than an equivalent amount of vegetables in frozen or canned form. Elimination of excess water from potatoes alone will, as estimated by official sources, save the army shipping space equivalent to two whole freighters.

It was not until 1917 that dried fruits and vege-

tables gained importance, and as dehydration reduces by 50 to 95% the space and weight requirements of transportation and at the same time lessens the demand for tin and other critical war materials of today, dehydration can not help but become important in the near future. Also, new and improved methods of dehydration have been developed in the past few years. Products that used to take many hours to dehydrate may now be dried in 20 seconds. Products such as dehydrated vegetables that used to become bleached, unpalatable, and tough when dehydrated, now dehydrate with more nearly the naturally fresh condition in flavor and color than ever before.

It is expected that the dehydration industry will in 1942 produce close to one hundred million pounds of vegetables, while it produced only approximately 1 million pounds in 1941, and in 1940 there were only seven concerns operating 15 plants which produced a total of approximately 5 million pounds of dehydrated vegetables. On the average, one pound of dehydrated vegetables is the equivalent of about 15 pounds of fresh vegetables, and in fruits one pound dehydrated fruit is equal to 5 pounds of fresh fruit.

Within the first 120 days of lease-lend food buying, 4,500,000 lbs. of dehydrated soups, probably all destined for Britain was purchased by the Surplus Marketing Administration. There have been reliable reports of dehydrated food shipments, via bomber, to Australia and England, by way of Newfoundland and various other points overseas, within the past few months. It is said that test flights have proven that a stripped bomber can carry enough dehydrated food in a single trip to provide one meal for 500,000 Englishmen. However, it was pointed out by aviation experts that even though stripped of armament etc., most planes now being ferried across to England by the North Atlantic route start out with a heavy overload in gasoline alone.

Perhaps the most staggering figures of all in the production of dehydrated foods will be reached after the war when the United States plans the largest relief expedition in history to aid or help feed famine-stricken Europe. In order to make the food go as far as possible, one executive suggests assortments made up especially for an intended destination. If the potato crop in one section of the country is exceptionally good, then the food that is received in that specific area will contain all the body-building vitamins except the ones that potatoes contain.

As a result of the needs for foods that are fresh, or as similar to the fresh product as possible, there has risen a need for dehydrated foods. We know, for it has been proven in the past that before fighting forces can go very far, they must be supplied with the proper foods and plenty of them. So, as

Continued on page 24



# I Dare You!

By E. B. Collins, '43

"I dare you to stand tall, think tall, smile tall and live tall—to be your own self at your very best all the time." This challenge is an eternal stimulation to those who have come in contact with William H. Danforth, one who is man enough to accept his own challenge, one who, starting in a two-by-four wood shed mixing his own feed, has established The Purina Mills Inc. and become one of the nation's outstanding men in the field of agriculture. This is a stimulation which gives each year approximately 350 Camp Miniwanca campers a new but amazingly practical slant on life.

Camp Miniwanca, near Shelby, Michigan, and on the shore of Lake Michigan, is the American Youth Foundation Camp to which 38 agricultural college juniors and 38 agricultural college freshmen are asked each summer in a two weeks program of life at its best along with a total of approximately 350 boys from all parts of the United States and Canada.

To adequately describe the experiences, pleasures and truly life building qualities received from Miniwanca is impossible. That has been tried continually since the Camp's foundation, and all must resort to the challenge "I dare you to win a Danforth Fellowship and see for yourself."

How would you, agricultural freshmen, like to meet a selected group of boys from all parts of the United States and Canada? How would you like to spend two weeks in a tent with possibly one boy from Canada, one from Louisiana, one from Colorado, one from Maine, one from Ohio, and one from Wash-

ington? A "bull session" made up of a group of such fellows is truly a super "bull session." How would you, agricultural junior, like to spend two weeks at St. Louis, Missouri, getting the inside story of one of the greatest businesses in America, coupled with two weeks at Camp Miniwanca. How would you like to play softball with Illinois pitching, Louisiana at short, Colorado at second, Washington on first, Kentucky catching, and the outfield manned by boys originating from various states between Maine and California? Wouldn't it broaden your life to travel across several states; meet, live, and discuss problems with 37 outstanding juniors from the United States and Canada; study the business methods and principles of one of the largest agricultural industries in America, hearing lectures by great nutritionists, chemists, salesmen, bacteriologists, advertisers, and personnel directors—men of education and practical experience; visit one of the best managed experimental farms in the country; tour the cities of St. Louis, and Chicago, seeing a major league baseball game and other nationally known entertainments and sites of interest; and, as a clincher, listen to great leaders, philosophers, and psychologists at Camp Miniwanca? Don't be fooled; those aren't ordinary classes taught by ordinary people. They are classes that bring you to the edge of your chair with their sincerity and gravity of purpose—classes taught by the outstanding men in those fields. That, agricultural juniors, is in a nut-shell what the Danforth Fellowship has

Continued on page 6



Clemson's 1942 Danforth Fellowship Winners with Mr. Danforth. Left to right: Henry Parr, a Sophomore; Mr. Danforth; and Edwin Collins, a Senior.



Members of Alpha Zeta honorary Agricultural Fraternity, who were among the 350 at Camp Miniwanca in 1942.





# The Extension Service Continues

By W. B. Camp, '44

*In spite of handicaps, the Extension Service forges on*

At the time when nationwide conscription went into effect, the South Carolina Extension Department did not have a special pre-developed plan for training a large group of new agents to replace those called into service. Their regular training plan for the small number of agents needing training was functioning well but soon became over-taxed.

The extension department could not afford to let the service run-down because the public expects the extension force at Clemson College to give guidance in organization and production and in supplying urban and military foodstuffs. The extension service is also looked to for guidance in better living, especially in the nutrition of the farm family. As a result they began to look for new men to keep organized farm production and the production of foodstuffs going at a high rate.

These men have to have some training already. They must have the equivalent of four years of college and some farm experience in order to become county agents. After these men are selected, they are sent out to work under the guidance of county agents. The county agents give special attention to these new men. During the summer after this period of apprenticeship they are brought in to Clemson College for a week's special training course. Here the extension specialists in agronomy, horticulture, agricultural engineering, and other fields go over the extension programs with the men after which they have informal discussions asking questions and explaining the topics. They are then sent out to work as assistant county agents. These assistant county agents assume more responsibility as their knowledge increases. They become county agents when a vacancy exists and are picked in order of preference.

District meetings are being held often. There are about fifteen counties in each district, and all of the county agents and assistants attend to discuss a subject of coming importance.

The vacancies in specialists positions are being filled by picking specialists in their fields. This is the most difficult vacancy to fill as good specialists are hard to find.

To some extent, the extension department still feels the loss of experienced men. They have a staff of one hundred white men employed. The first man left for the service on January 1, 1941, and during the course of the year, they lost ten men. So far they have lost forty-three men during 1942. They feel the loss in 1942 more because it is an added loss; it represents 43 per cent of their employment. They have replaced about thirty-five men and are in the process of replacing three or four more at the present time, but there are still vacancies not yet filled.

Everyone of the men lost except two, went into the army as officers, ranking from second lieutenants to captains as a result of their college R. O. T. C. training; the highest ranking one is now a major. The two that did not enter as officers in the army are specialists in the Navy.

The extension service has never asked for a deferment for men in extension work since the war broke out.

They are expecting to lose additional men to the selective service, but the training program is rapidly progressing to try to counteract this loss.

About ten of the men lost have been specialists. G. E. Mears was the last man to go. He has been assistant director for the past three years and then went to a Maryland arsenal as a first lieutenant.

—THE AGRARIAN—

## I DARE YOU!

Continued from page 5

to offer this year's outstanding agricultural junior. Someone once said, "Your horizons broaden as you climb higher." Agricultural freshmen and juniors, would you like to realize the full significance of that statement as applied to your own lives?

Next spring when the iron in your blood seems to be slowly changing to lead, a faculty committee will be at work selecting a freshman, who, with a half-scholarship, will represent Clemson at Camp Miniwanca for two weeks and a junior who, with a full scholarship, will spend two weeks at St. Louis and two weeks at camp Miniwanca. These scholarships are awarded by the Danforth Foundation, of which Mr. William H. Danforth is President. The basis of selection is that of scholastic grade average, participations in worth-while activities, fine qualities of character and personality, and evidence of Christian leadership in church work. The freshman winner is chosen upon one year's activities at College. The junior is chosen upon three years of work. The time for all freshmen, sophomores, and juniors to start is now.

Each of you can be a winner. Is winning limited to one freshman and one junior? I dare say it is not. Every boy can be a winner. It is true that all can not receive a Danforth Fellowship, but the heights that one reaches in trying to accomplish anything can't be taken away from that individual's life. In the true analysis, we all can be winners.

I dare you, agricultural freshman or junior, to win a Danforth Fellowship. I dare you, agricultural student or whoever you are, to be a winner.

# Wide and Narrow Row Tobacco

By W. S. Jackson, '43

*Improved methods of cultivation reap higher profits*



COURTESY S. C. EXTENSION SERVICE  
Demonstration of wide-narrow row tobacco.

Tobacco is a great crop. By this I mean that it can be planted, transplanted, cured, and marketed before cotton picking time. Not only is tobacco a great crop, but it is an expensive crop whether good or bad. A farmer is justified in planting only the best tobacco land and only an acreage that he can take care of properly in every stage from the plant bed to the market. The following article is based on an experiment which was run on the farm of W. J. Jackson of Manning, South Carolina, who helped to prepare this article. The experiment deals with a new method of growing tobacco known as the wide row method.

First, the land was bedded out in eight foot rows early in the winter. This was done by using one of the larger two-horse turning plows. As soon as this was finished the middle was taken out with a 24 inch sweep. The land was not disturbed further until the time of planting.

At the time of planting a drag harrow was run crossways of the bed to loosen the crust which had formed and to level the land. By using a two-horse opener, a furrow was run in the top of each bed. Half of the fertilizer used was placed in this furrow and mixed with the soil. After this, two furrows with a large two horse turnplow was run making a high bed about two feet wide. The other half of the fertilizer was then placed in the furrow behind the turnplow, giving one-fourth of the total fertilizer to each side of the first large bed. The next operation was to cover this fertilizer by using a one-horse turnplow which did not throw the bed quite as high as the large plow. This plow was used to run six furrows, which

left a small bank in the center of the row, which was taken out with a large sweep. The tobacco was set immediately after the land was prepared.

In setting the tobacco in the field a small compass was used to mark the spacing of the hills. One row was set out on each side of the first large bed which was made with the two-horse turnplow, or on top of the first one-horse turnplow furrow. This placed one fourth of the total fertilizer under the plant and one-half between the rows of tobacco.

After about ten days the tobacco was reset. It was noted at the time that this tobacco required far less resetting than tobacco planted the old way. It was also noted that tobacco planted this way caught roots and grew off much faster than the tobacco set in the single rows. Particular attention should be given to the first setting, because under favorable conditions the original of first setting will grow so fast that it will smother out the reset plants and they will not be able to produce as they should. Therefore, it is important to do as little resetting as possible with the wide row tobacco.

In regard to cultivation, the wide row tobacco requires very little if any cultivation. On this particular plot the tobacco was cultivated first by pulling the soil from the outer bed (between the two rows of tobacco) down to the plants. Very few weeds will grow between the rows. After the soil was pulled down around the plants, a one horse turn plow was used to throw up more soil from the middle of the row; and before the middle was taken out, one hundred pounds of Sulphate of potash was scattered over the middle. The middle was then taken out with a 22 inch sweep. A few days later a hoe was used to remove any grass that may have come upward to work the reset plants.

The tobacco was poisoned for bud worms and horn worms a few times. When it had reached maturity the blossoms were broken out and the succors were removed. The tobacco was succored three times in all.

At the first cropping, all overly ripe or burned leaves were pulled off and dropped on the ground. From then on the tobacco was cropped once weekly, the same as any other tobacco. However, in five croppings. During the curing process, the wide row tobacco responded to the heat rapidly and cured out with a rich lemon color of very good quality.

The plot of tobacco yielded 1224 pounds of tobacco per acre and sold for a net of \$427 per acre. The wide row tobacco made slightly more than any other on the farm last year with a little less expense. Yes tobacco is a great crop. If you don't believe it, then I would suggest that you grow a little if the soil conditions are suited.



# The Agrarian Presents

## RUPERT A MCGINTY

*Director . . . Research Worker . . . Advisor . . . Scholar*



**Rupert A. McGinty, Vice-Director of the S. C. Experiment Station**

Rupert A. McGinty, a native of Chambers County, Alabama, was born and reared on a farm. He attended Birmingham Southern College and Alabama Polytechnic Institute, graduating from the latter with a B. S. degree in Agriculture in 1913. Following his graduation, he became Instructor in Horticulture in Colorado Agricultural College, and was later made Assistant and Associate Professor of Horticulture in the same institution. In 1918-19 he became a graduate student at Missouri Botanical Garden, receiving his A. M. degree from Washington University in June 1919.

In 1920-21 Mr. McGinty was field manager of the Colorado Packing Corporation, Canon City, Colorado, large canners of fruit and vegetables. He left the Colorado Agricultural College for a year and a half to take this position and then returned to the college to resume his teaching job.

Mr. McGinty was a graduate student and instructor at Cornell University in 1926-27, specializing in vegetable production, soil, and plant physi-

ology. He spent the summer of 1927 as field assistant at the New York Experiment Station at Geneva. In 1928 Mr. McGinty accepted a position as head of the Department of Horticulture at Clemson College. He went to Oklahoma A & M College in 1932 as professor of horticulture and head of the department, returning to Clemson in October 1934 to assume the duties of acting director of the experiment station. He was appointed to his present position of Vice-Director of Research July 1, 1936.

Mr. McGinty is co-author of "Agriculture for Elementary Schools" and "Southern Vegetable Crops," published by the American Book Company 1933 and 1937 respectively. He is also author of a number of bulletins and papers dealing with vegetable crops. In 1935 he initiated the movement which resulted in the location of the U. S. Southern Regional Vegetable Laboratory at Charleston, South Carolina. This laboratory proves to be of great value to the South in breeding varieties adapted to this section of the country.

Mr. McGinty took the leadership in securing a chapter of the National Honor Society of Phi Kappa Phi for Clemson and with Dr. D. C. Sheldon established the local chapter of the Freshman honor fraternity of Phi Eta Sigma.

In 1939, with the help of Drs. F. S. Andrews and W. C. Barnes, he developed the valuable new variety of okra named Clemson spineless. This variety has achieved the outstanding distinction of being awarded a silver medal in the "All American Selections of the American Seed Trade Association". He also made the original selection from which was developed the "Edisto Station 24" strain of Puerto Rican Sweet Potato introduced in 1941.

R. A. McGinty married Letitia Ella Cross, of Birmingham, Alabama, in June, 1914. Their children are: Thomas F. McGinty, 2nd Lieut. Air Corps (Communications Div.), Boca Raton, Florida; William M. McGinty, 1st Lieut. (Regimental Adjutant), 118th Infantry, Iceland; Mrs. T. E. Jackson, Clemson, South Carolina—Her husband, Lieut. Jackson, is in Iceland; Richard A. McGinty, Clemson, South Carolina.

Mr. McGinty is a member of the following organizations: Sigma Xi, Phi Kappa Zeta, Phi Eta Sigma, American Society for Horticulture Science, Clemson Fellowship Club, and Fort Hill Presbyterian Church.

After working hours, Mr. McGinty gets a lot of pleasure out of working in his garden. He is also keenly interested in photography, and in his spare moments, he snaps pictures of whatever catches his eye.

On Wednesdays from twelve until one, one will often hear Mr. "Mc's" voice on WAIM's "Science in





Mr. McGinty examines the Clemson Spineless Okra that he developed.

## Agricultural Problems During the War

By L. O. Drew, '44

Today our agricultural program is in a serious situation. The farmers are trying to produce more farm products with much less labor and equipment. Our greatest problem at present is keeping labor on the farms. One would think off hand that the Selective Service Act would be taking the heaviest toll of our able-bodied men on the farm; but in some sections of the country, defense industries with their high wages are luring most of the men away. In some of these areas, it is reported that seven men are leaving jobs on the farm for industrial jobs to every man who leaves to join our armed forces. There is a reason for this migration of farm laborers to the defense jobs; farm prices have risen fifty-two percent since 1910-1914 while the hourly earnings of factory workers have risen three hundred and forty-eight percent. Many sections of the country farmers report that they are planning to reduce their output next year. Their reason for such action, they say, is because of the shortage of labor. After the high pay of war industries has drained off the farm workers and tenants, only the key men on the farms are left. Then the Selective Service drafts many of these men, thereby leaving no one to manage the farms.

Our Government is now beginning to take action on this labor problem. Many draft boards are now deferring men who are engaged in the production of meat, poultry, and dairy products. By drafting the eighteen and nineteen year olds, many of the older married men or key men on the farms are permitted to remain at home and do their part toward winning the war by keeping their farms producing.

This question is being asked: Can the war effort afford the drastic cut in farm machinery and equipment as is proposed for 1943? Last year many people predicted disaster as farm machinery manufacture was cut to eighty percent of that manufactured in 1940-41. However, in spite of such action, the farmers of this country succeeded in producing the second largest wheat crop in history. This year there will be produced only twenty-three percent of the machinery and equipment produced in 1940-41. We can see, therefore, that the only way which we can keep our production of farm products up near the previous levels is by making efficient use of the machinery and equipment we now have. Repair parts will be produced and made available to the farmers. The production of repair parts this year is to be one hundred and thirty-five percent of what it was in 1940-41. To make the most efficient use of machinery and equipment it should be kept in constant use all of the time. Contract farming and the exchange of machinery should be promoted; tractor equipped with lights should be kept running night and day.

Secretary of Agriculture Wickard says, "Food will win the war and write the peace." It, therefore, remains for the farmers of America to put forth their best efforts, make the best use of what they have, and win the war by producing the necessary food.

Agriculture." Other prominent men on the Clemson campus are heard on this program from time to time.

If you'd like to see a disturbed expression, just ask Mr. McGinty to write or edit a report. This particular task is a pet peeve of his.

Clemson College and South Carolina are indeed proud of Mr. McGinty. He has accomplished some brilliant research work which is a credit to the college and state. Although he is extremely busy with the Experiment Station, he willingly gives much of his personal time and energy in working with the Clemson students in their clubs and organizations. Clemson men appreciate his devoted efforts along these lines.

Mr. McGinty is worthy of any praise we can give him here. We sincerely hope that others will look toward him as a symbol of success and achievement.

—THE AGRARIAN—

### JERSEY SALE HELD IN NEWBERRY SEPT. 7

The South Carolina Jersey Cattle Club held its annual consignment sale in Newberry, S. C. Thirty-eight head were sold for an average of \$287. The top cow, Design Alice Chic, sold for \$2,000. This cow was owned and bred in South Carolina, and was bought by Happy Valley Farms, Rossville, Georgia.

—THE AGRARIAN—

### KAPPA ALPHA SIGMA TAPS NEW MEMBERS

Kappa Alpha Sigma, Clemson's Chapter of the American Society of Argonomy taps seven new members. The new members are W. B. Camp, D. H. Sloan, F. A. Yarborough, L. F. Holmes, C. W. Cain, and P. T. Bardin.



# The Fertilizer Situation This Fall

Editors note: The following is a condensation of the talk made September 16, 1942 by Dr. G. H. Collings, Professor of Soils at Clemson College, on the Science in Agriculture program presented each week by the School of Agriculture and the South Carolina Experiment Station. W. B. Camp of the class of 1944 condensed this article.

The government is asking us to produce more food so we can not only feed the livestock and the people of the United States but also care for the needs of peoples in other parts of the world; yet they say we can't have as much fertilizer as we have been using in the past. Why has this situation arisen? Well, shortages of manufactured goods these days are not confined to materials used by the farmer. It's a national complaint and will no doubt become more severe as the war progresses, for the shortages are nearly all due to the unprecedented demands of our war industries. The farmer is going to have to do without many of the things he has been accustomed to have in abundance. Our armed forces must have the weapons of war.

The army doesn't need fertilizers, but they do need many of the minerals and chemicals from which commercial fertilizers are made. Besides, we need to remember that a shortage of a particular material may not be entirely due to an increased demand by wartime industries. In the case of sodium nitrate, for example, the shortage is due in a large part to transportation difficulties. Not enough ship space is available to bring all the sodium nitrate we need from Chile.

Here in South Carolina commercial fertilizers are an essential for a profitable agriculture, and we may say they are essential to any kind of an agriculture worthy of the name. However, it isn't a question yet of doing without fertilizer but only a question of doing with the reduced supply which will be available. Fortunately, there is only a shortage of certain materials and not all fertilizers.

Except for the immediate future, it is impossible to say how much the shortage will be. Manufacturers of mixed goods buy their materials some months in advance; so, they already have on hand a part of next seasons requirements, and they are practically certain of the available supply of some of the basic materials.

Farmers have already had trouble in getting soda, and some folks have begun talking about rationing of fertilizer. I don't think mixed goods will be rationed—at least not in the immediate future. It may be, however, that we will be forced to rationing if the war is much extended. The only service shortage among the necessary plant foods is in the supply of nitrogen—such as is available in sodium nitrate. Already soda is being allocated by the fertilizer distributors, and in a sense, this is a form of rationing. Because of the transportation difficulties in obtaining Chilean nitrate of soda, it would appear now that farmers will be able to get a maximum of only 80 per cent of the sodium nitrate that they received last year. This is unfortunate in view of the governments



COURTESY S. C. EXTENSION SERVICE

**This luxuriant growth of crotalaria is an excellent crop for maintaining the fertility of the soil.**

demand that we grow more food, but I am convinced that farmers could ease this situation by using the soda they get more judiciously. I have long thought, for instance, that many of the big truck growers of South Carolina use more soda, as a side application to their crops, than is necessary.

The reduction of side applications to such crops as Irish potatoes, lettuce, peas, and string beans might well be made, for recent work by the South Carolina Agricultural Experiment Station has shown that large quantities used by many farmers for this purpose cannot be justified. The same fact is true with some of our field crops, such as cotton and tobacco, when grown on some soils.

Furthermore, farmers, especially in these war-times, should be growing at least a part of their nitrogen. Green manuring crops of Austrian winter peas, vetch, lespedeza, and cowpeas can be made to supplement, if not entirely replace, commercial nitrogen. In addition, many South Carolina farmers might pay more attention to the proper conservation of their farmyard manure.

It now appears that for next year, cotton seed and other meals and organics and ammonium sulfate will supply most of the nitrogen in mixed goods, but here again farmers will probably be able to get only about 80 per cent of the nitrogen they have been accustomed to use, since much of the seed meals will be consumed by the feed trade. According to a recent order of the War Production Board, no more mixed goods can be sold on the South Carolina



Market for the duration which contains more than 4 per cent of nitrogen.

There should not be a shortage of phosphoric acid. Our supply of phosphates in Florida and Tennessee and of sulfur in Louisiana and Texas are unlimited for the present at least; so, I expect no shortage of superphosphate. In fact, I am inclined to believe that our total state consumption of this plant nutrient will be greater this year than last year. Certainly farmers will be able to get all the phosphoric acid they want; unless, of course, unexpected transportation difficulties develop and change the picture.

South Carolina farmers should use as much or more phosphoric acid as they have been accustomed to using because it would appear necessary if we are to produce more feed and food, because South Carolina soils are deficient in this element. However there are South Carolina farmers who have been using more phosphoric acid than their crop yields justify. I am speaking now of those farmers who are farming moderately acid soils. If these farmers would lime their soils, they would not need to apply so much phosphoric acid in maintaining their crop yields. In this way many individual farmers could greatly reduce their consumption of phosphoric acid.

I am not expecting a shortage of potash; although, it is possible that a slight shortage may develop. It is possible that strikes and perhaps transportation difficulties may somewhat alter the present outlook.

South Carolina soils and crops need more potash than they have been getting, especially the sandy soils. Cotton rust is due to a deficiency of available potash. If enough potash is available on the market, I look for more of it to be used in South Carolina next year than this year, and the consumption of fertilizer mixtures carrying 5, 6, and 8 per cent of potash will be fairly large.

There should not be a shortage of liming materials. However, I am sure there will continue to be

a tremendous deficiency of lime in our South Carolina soils because it has existed for years, and many farmers still refuse to apply sufficient quantities of lime. War or no war, the supply of liming materials from local sources should far exceed our consumption.

Many farmers ask, "just what's the use of putting down more potash and superphosphate if at the same time we are to have less nitrogen?" As I have mentioned, cotton rust, which indicates a deficiency of potash in our soils, is all too prevalent, and in addition, our moderately acid to very acid soils require more phosphoric acid than they would if we used the lime we should and don't. This means, that under the practical farm conditions that exist in the state, more potash and more phosphoric acid than we have been applying might be used profitably. If liberal amounts of phosphoric acid and potash are applied, we should obtain a more efficient utilization of the limited supply of nitrogen which will be available.

—THE AGRARIAN—

## Agriculture's Place in the War Effort

continued from page 3

the American farmer can be depended upon to make the efforts and sacrifices necessary for the production of the essential farm products. With favorable climate and the extra efforts that will be made by American farmers, it is possible and highly probable that the war demands may result in the establishment of an all time high record for the production of farm commodities.

## MARETT FARM & SEED COMPANY

Plant Breeders In Field Seeds

COTTON -- BARLEY -- WHEAT -- OATS

K. A. Marett, *Directing Plant Breeder and Manager*

W. T. McClure, Sr., *Plant Breeder*

Lt. W. T. McClure, Jr., *Plant Breeder, (Now in armed services)*

S. J. Hadden, *Plant Breeder*

Westminster, S. C.



COURTESY S. C. EXTENSION SERVICE

A legume such as this will supply the soil with Nitrogen from the air.





# BETWEEN THE

## AGRONOMICAL SUGGESTIONS

1. Plow heavy clay land now if practicable and make spring work easier. 2. Oats can still be planted. 3. Sow enough wheat to make a good supply for home use. 4. Don't leave cotton unprotected from weather; it may lose five or ten dollars per bale in value. 5. Destroy at once any remaining cotton stalks. 6. Begin preparing synthetic compost piles. 7. Buy and apply limestone.

—THE AGRARIAN—

## DR. G. H. COLLINGS ANNOUNCES PUBLICATION OF NEW BOOK

Dr. Gilbert H. Collings, agricultural editor of the Blakinston Publishing Company, announces the publication of a new book. This book has been adopted by the plant pathology department, and is being used by Clemson Juniors and Seniors. The new book is entitled **THE NATURE AND PREVENTION OF PLANT DISEASES**. Dr. Collings is the author of **COMMERCIAL FERTILIZERS** also used by Clemson Juniors and Seniors.

—THE AGRARIAN—

## DR. GORMAN COMES TO EXPERIMENT STATION

Dr. W. H. Gorman came to the experiment station this summer. He is a graduate of Penn State, and was formerly connected with the Texas experiment station and the agronomy department of the University of Georgia.

—THE AGRARIAN—

## BORDEN PLANT OPENS

The Borden Milk Company opened its new \$250,000 plant at Chester, S. C. in June. A receiving station has been set up in Newberry, S. C. This plant is getting about 43,000 lbs. of milk each day and is paying \$1,000 each day to South Carolina farmers. It was formerly used as a cheese plant but was converted to an evaporating plant in June. The farmers are not expected to go into the dairy business, but are to use this new market as an additional source of farm income. Some farmers have doubled their income by taking advantage of this new milk market.

—THE AGRARIAN—

## MORE MILK FOR MORE CHILDREN

How the school milk program works:

1. The school milk program must be under written by a local sponsor, school authority, Parent-

Teacher Association, or other responsible group, who will make all negotiations with dairies and provide the necessary facilities.

2. The sponsor will sign an agreement with the Agriculture Marketing Administration in which the sponsor agrees to purchase and distribute the milk to the children. The AMA agrees to reimburse the sponsor in an amount equal to the farmer's price for unprocessed milk.

3. The sponsor assumes responsibility for all handling costs. To meet them, wholly or partly, the sponsor may charge each child **NOT MORE** than a penny for a half-pint of milk.

—THE AGRARIAN—

## STOMACH WORM TREATMENT FOR CATTLE

Phenothiazine is being used with good results in treating cattle for stomach worms. It can be given as a drench or in a capsule form. The dose is twenty grams of powder for each hundred pounds of live-weight with a maximum dose of six and a half fluid ounces suspension or three ounces of powder for animals weighing over four hundred pounds.

Do not use milk from animals for any purpose whatsoever for seven days after dosing.

Do not starve animals before dosing.

—THE AGRARIAN—

## CLEMSON MEN ATTEND MEETING OF LAND-GRANT COLLEGES

Dr. R. F. Poole, Dr. H. P. Cooper, and R. A. McGinty attended the Fitty-Sixth annual convention of Land-Grant Colleges and Universities. This convention was held in Chicago, Illinois on October 28-30. The program centered around the wartime responsibilities of the Land-Grant Colleges and the part these colleges are to play in carrying on the war.

—THE AGRARIAN—

## HORTICULTURAL ADVICE

1. Prepare land now for setting fruit trees for home orchards in November and December. 2. Prune scuppernong type grapes last of November. 3. Make cuttings of grapes and figs and set them out. 4. Set strawberry and raspberry plants. 5. Sow lettuce in coldframe for use in January and February. 6. Harvest carefully sweet potatoes, if not already harvested.



# FURROWS

## DAIRY CLUB SERVES FIGHTING DAIRY GRADUATES

The Clemson College Dairy Club is undertaking a project of service for the dairy graduates in the armed forces. The club is now finding out where these graduates are situated, and a list of these men will be compiled and mailed out to the fighting Clemson dairymen.

—THE AGRARIAN—

## ALPHA ZETA TAPS NEW MEN

The Clemson chapter of Alpha Zeta has tapped ten new members. The new members are E. B. Eskew, G. H. Faurey, H. Cohen, M. O. Berry, J. P. Mikell, J. H. Cannon, H. M. Simons, E. W. Allen, R. W. Touchberry. These men were elected to membership in the club because of outstanding scholastic achievement, leadership, and character.

—THE AGRARIAN—

## DR. A. D. EDWARDS JOINS FACULTY

Dr. A. D. Edwards, associate Rural Sociologist, comes to Clemson from V. P. I. Dr. Edwards is in the department of Agricultural Economics, and is also affiliated with the Experiment station.

Before going to V. P. I., Dr. Edwards taught three years at The American University in Syria.

—THE AGRARIAN—

## DR. GILBERT H. COLLINGS HONORED

Dr. Gilbert H. Collings has been elected to Who's Who in The Western Hemisphere. The book is made up of the leading scientists in the western hemisphere, and is printed to help bring the scientists of North and South America closer together, that they may study the problems that confront these countries.

—THE AGRARIAN—

## CROTALARIA PROVES WORTH

Beaufort county farmers who planted Giant Striata crotalaria this year are greatly pleased with the results, County Agent S. B. Walker reports. Three of the crotalaria demonstrations were checked; M. L. Bostick made a yield of 26.2 tons per acre; E. B. Mitchel, 24.4 tons; Fred Ewing, 26.6 tons. "There was no Striata planted in the county last year, but as a result of our drive in the spring 10,000 pounds of seed was ordered," says Mr. Walker. "Farmers who seeded this type found it better adapted than the Carolina variety. Several farmers put four or five rows in corn alleys and found this satisfactory also."

## ALPHA TAU ALPHA TAPS NEW MEMBERS

Alpha Tau Alpha, national professional fraternity, for students of vocational agriculture has chosen the following members: R. E. Linder, Chapin, (junior); R. M. Richbourg, Camden, (junior); J. E. Herlong, Saluda, (junior); C. S. Hughey, Greer, (senior); C. B. Pence, Tatum, (senior); and W. F. Minton, Lewiston, N. C. (senior). Membership is based on scholarship and leadership. Other members include: Ralph Hoffman, Georgetown, C. B. Lowman, Lexington, C. H. Brown Travelers Rest, W. S. Jackson, Manning, W. A. Collins, Mullins, L. E. Pence, Tatum, N. J. Thomas, Knoxville, Tenn., and L. R. Cox, Russellville.

—THE AGRARIAN—

## REPAIR FARM MACHINERY NOW FOR NEXT SEASON

CLEMSON. October 17—Placing farm machinery and equipment in good shape now can insure South Carolina farmers against costly delays later, according to C. V. Phagan, Clemson extension agricultural engineer.

Curtailment in the manufacture of farm machinery next year will make it extremely difficult for many farmers to get farm machines as replacements for old or worn-out equipment, the specialist said. For this reason, it is highly important that farmers check up on their machinery now and make plans to recondition it for another year's operation.

—THE AGRARIAN—

## COOPERATION FOR BETTER COTTON

"Our 100 percent better farm living community, which selected one variety of cotton—Coker 100 Wilt Resistant—had favorable weather conditions, and most of the farmers are making a bale per acre," says W. H. Craven, county farm agent. "The seed orders were obtained by the local leaders with the assistance of the county agent, and one leader hauled the seed for community delivery. This variety has stood up under severe wilt conditions."

"The farmers have shown splendid cooperation in harvesting and saving planting seed, and we have placed 1,200 bushels, with additional orders to be filled in October. It is reasonable to expect that this community will be practically 100 percent one variety in 1943, and some of the growers will buy seed direct from Coker next spring for their entire plantings."



# Price Parity and Congress

Editorial . . . By J. S. Schaffer, '43

We hear a great deal about giving the farmer parity. This idea originated in George Peek's book, *EQUALITY FOR AGRICULTURE*, which was written about twenty years ago. He defined parity as, "the price which bears the same ratio to the current general price index as the ten year pre-war (first world war) average crop price bore to the average price index for the same period;" however it is generally accepted that parity is based on the period between August 1, 1909 and July 31, 1914. Congress in 1933, tried to do this when it passed the Agricultural Adjustment Act.

Parity is determined from 20,000 reports which the Department of Agriculture receives. It compares the prices of major farm crops and the 174 commodities that farmers purchase most.

The President, in his speech of September 7th, asked Congress to pass legislation that would give him powers to set prices and said that 100% parity was a just farm price. Immediately the farm lobbyists converged upon Washington. The organizations represented in the lobby were the American Farm Bureau Federations, National Grange, National Council of Farm Cooperatives, and the National Milk Producers Federation. Now who do these organizations represent? They do not represent the small farmer, but large well-to-do farmers instead. They represent the 10% of the farmers that produce 50% of the farm products. They had men working for them in the House of Representatives and the Senate. Paul Brown of Georgia, Henry B. Steagall of Alabama, and Hampton P. Fulmer of South Carolina were their representatives in the House. By a vote of 205-172 these men engineered a bill through the House that would raise parity to 112% in spite of the fact that the Gallup Poll, whose record has shown it to be completely reliable, showed that 71% of the country favored the President's bill for 100% parity while only 11% were against it.

In the Senate, the farm bloc leaders are Carl Hatch of New Mexico and Elmer Thomas of Oklahoma. There were excellent indications that the farm lobbyists were going to win the Senate as they had the House until Senator Prentiss Brown from Michigan arose to speak. He told the Senate that they had to choose whether they were going to be run by the desires of the vast majority of the people or the interests of a handful. He said that the Senate must avoid the possibility of a clash between the executive and legislative branches at this time. The whole country was watching the Senate, and the good Senators reaped their reward. Congress was adjourned for the week end, and during this time the nation let the Senate know how it felt about the bill. The bill never materialized and a clash of major importance was narrowly avoided. Let no one say that the farmer does not do his share. It is his sons who fight the

war and his hands that till the soil to feed this nation at war, but the few who are interested in only themselves are putting all farmers in a bad light to those who are not acquainted with the true facts.

A lesson should be drawn from this occurrence. The farm lobby is not the only one gnawing at the heart of Congress. There are hundreds of other greedy little men who have only the interest of those who line their pockets with filthy lucre. They don't know the meaning of the word patriotism. Their standard is the gold standard. They are opportunists who would sell their souls to the highest bidder. It doesn't matter to them that we are fighting a war for our very existence so long as it will bring them greater monetary return; they are the men that would sell out to the dictators. Let us beware of them, for they are like crawling little rats who chew away at the foundations of our democratic institutions.

—THE AGRARIAN—

Pity the poor farmer who feels that he has nothing to learn from exhibits at fairs.—Bryan.

Clemson's 2,300 Cadets

CUT A CLEAN FIGURE

WHY?

CLEMSON COLLEGE  
LAUNDRY

# CLEMSON'S BLUE MOLD CHEESE

*A new substitute for imported Roquefort Cheese*



In the summer of 1938, an inspection of Stumphouse Mountain tunnel revealed to Dr. P. G. Miller, Clemson Associate Dairyman, potentialities necessary for the curing of Blue Mold Cheese. Permission to use the tunnel for research study was obtained in July, 1940, and the first batch of Blue Mold Cheese was ready for curing by January, 1941.

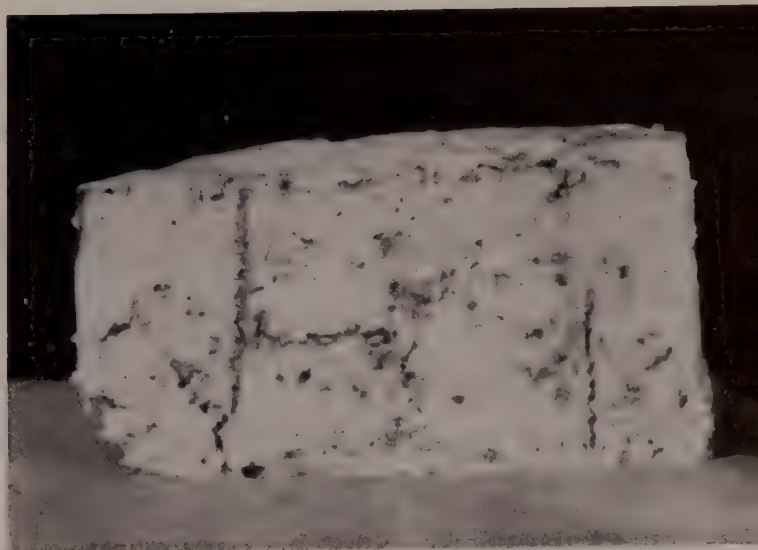
After remaining in the tunnel for a three-month curing period the cheese was wrapped and stored in a cold room at the Clemson College creamery. By this time a luxuriant growth of blue mold had occurred within the cheese, and a pronounced characteristic flavor had developed. Experienced judges examined the cured cheese in May and described it as a product of excellent quality.



COURTESY S. C. EXPERIMENT STATION  
An interior view of the stumphouse mountain tunnel showing cheese on a make-shift table.



COURTESY S. C. EXPERIMENT STATION  
Cheese aging in the tunnel. The cheese standing on edge has just been punched full of small holes to allow the entrance of air. The cheese lying flatwise has just been salted by rubbing salt onto the surface.



COURTESY S. C. EXPERIMENT STATION  
Cross-section of a cured cheese showing the distribution of the mold growth.



# SELECTION OF PEACH VARIETIES

By C. K. Stuart, '44

*Successful peach growing requires a knowledge of the varieties grown*



Select only the best varieties

COURTESY S. C. EXTENSION SERVICE

Peach growers in common with the growers of other horticultural crops are confronted with many problems. One of the most important is varietal adaption and selection. Varieties of peaches for commercial production in South Carolina should produce fruit which possess good color, flavor, size and quality combined with good shipping ability. With the development of the canning industry, high quality, uniform shape and large size are also essential.

Factors that should be considered in the selection of a variety are (1) ripening date, (2) quality, (3) color and size, (4) shipping ability, and (5) date of blooming.

The first factor to consider is the ripening date. The ripening date of a particular variety is ordinarily compared with the old "standby," Elberta. (In this article dates are given.) Growers have been wanting early varieties that possess all the characteristics

that are necessary for a good shipper. Until recent years many varieties that have been on the market before the Elbertas have been inferior in quality. Many growers grow only Elbertas and approximately 65 per cent of the over four million trees in South Carolina are Elbertas. When so many peaches reach the markets at the same time the markets become glutted and hence, a very low price per bushel is received. Now since new early varieties are available, the growers can capitalize on the good prices that can often be obtained before the Elberta season begins. In this way the peach grower can profitably enjoy a much better and longer peach season. As more growers plant varieties other than the Elberta, glutting of the markets will be eliminated to some extent.

The second factor to be considered is quality. The term quality embraces the edible characteristics. The variety to be selected should have a good flavor,



good flesh color, a melting texture and should not be too dry and stringy.

The third factor to be considered is the color, size and shape of the fruit. The fruit should possess a sufficient amount of red color to make an attractive appearance. Usually the more red color the better the appearance. Most of the new varieties have more red color than many of the older varieties. The size and shape should be uniform. Irregularities in size and shape are very undesirable. The variety that is chosen should produce fruits that have a fair size and uniform shape when the tree is heavily laden with fruit.

The fourth factor to consider in the selection of a variety is its shipping ability. There are many excellent varieties that are very desirable for local markets and home use, but are unfit for shipping. Some of these varieties are superior to the good shippers in appearance, and also in edible qualities, but they do not possess the thick, tough skin that is essential for a good shipper. Although peaches are in refrigerator trucks and cars, they must be able to withstand the rough handling they receive from the time they are picked until they reach the consumer.

Time of blooming is of considerable importance in southern peach sections and of little importance in others. If a good site is used for the orchard, late frosts or freezes in late winter and early spring cause less damage than when poor or frosty sites are chosen. For example, the Valiant variety blooms three to five days earlier than the Vedette variety and some years the Valiant crop is killed while the Vedette produces a crop practically every year.

It is, therefore, necessary for the successful grower to study all the characteristics of the variety or varieties he is planning to plant. He must choose a variety that possesses excellent color, size, shape, quality and still meet all the requirements of a good shipper if the crop is to be sent to distant markets. Above all, he must choose and produce a product that will appeal to the consumer.

The following notes are intended as comments on the performance of the varieties for the 1942 season,

**The peach enterprise is assuming more and more importance in South Carolina.**

COURTESY S. C. EXPERIMENT STATION



COURTESY S. C. EXPERIMENT STATION

**Picking Elbertas in the Piedmont**

and are not intended as full varietal descriptions. Observations on the following varieties were made at the Sandhill Experiment Station, Columbia, South Carolina. Some of the observations are necessarily limited because some of the varieties fruited for the first time in 1942.

The ripening dates are indicated by the dates in parenthesis, with the date of the first picking indicated first and the date of last picking shown last.

**EARLY DISCOVERY.** (June 8-17). White cling of good color and size. This peach has a fair flavor for an early variety. It holds up well after picking.

**MARIGOLD.** (June 10-19). This is a highly colored, medium size peach with a very good yellow flesh color. It is a freestone when dead ripe. This peach has better quality than any variety near its season.

**ERLY-RED-FRE.** (June 15-22). A semi-free only when ripe. It is quite attractive on account of its size and red color. It colors well before softening and apparently would hold up for shipping as well or better than other early varieties.

**BEST MAY.** (June 17- ). The ripening period is very prolonged and the well colored fruit hangs on the tree a long time after coloring. The flavor is very perfumed. It is a very good roadside market variety.

**MIKADO.** (June 17- ). This variety, although it has good flavor, is entirely too tender for handling even as a locally consumed variety. It is not recommended for planting.

**FISHER.** (June 17-24). Very attractive in appearance and quality should justify limited planting by everyone.

**RARITAN ROSE.** (June 29-July 5). A white fleshed, freestone of fair quality and attractive color.

**NEWDAY.** (June 29-July 13). This freestone variety has a prolonged ripening season. This fruit has an excellent ground color with an attractive blush when hard ripe. It could probably be shipped suc-



Continued on next page





cessfully. It possesses a very distinctive flavor of fair quality but somewhat too acid.

**DIXIE GOLD.** (July 5-13). A disappointing variety as compared to other new freestone varieties. It is not attractive in appearance, has poor quality and the skin is too tender for handling.

**FLAMING GOLD.** (July 5-13). Very similar to Dixie Gold. It is not recommended for planting.

**GOLDEN GLOBE.** (July 5-13). This is an excellent yellow freestone variety for roadside and other local markets on account of its extremely attractive appearance, large size and good quality. However, it probably would not withstand shipping.

**SUNHIGH.** (July 5-16). The size, shape, color and edible qualities of this variety are very outstanding. However, there is some question about its shipping qualities. It is a yellow freestone and is recommended for limited planting.

**TRIOGEM.** (July 5-14). This yellow freestone variety has good color and appearance but its failure to size when trees are loaded makes it less desirable than some of the other varieties in this ripening date period. On heavier soils better size is usually obtained.

**FIREGLOW.** (July 5-14). Colors beautifully, ripens evenly and hangs on trees well after ripening. This should be a good commercial variety although its skin is not as tough as the Elberta or Halehaven. Ripening begins with the Halehaven but does not have as long a ripening season. Its quality is not as good as Halehaven but is perhaps more attractive in general appearance. It is a yellow freestone.

**JULY ELBERTA.** (July 3-16). This variety is highly colored and of good quality but is somewhat coarse and dry. It does not have the Elberta characteristics. It is not considered as good as the Halehaven as a commercial peach.

**GOLDENEAST.** (July 8-16). Goldeneast has not lived up to expectations. Fruit exposed to the sun tends to develop a dull, dark red that is not attractive. Likewise, the variety does not develop a good yellow ground color. Another fault of this variety is its tendency to show growth cracks at time of ripening. This is a yellow freestone.

**HALEHAVEN.** (July 6-20). This variety has been more closely observed by the author than any of the other varieties mentioned. The bud and fruit set are normally very heavy, necessitating thinning. The variety sizes very satisfactorily even under a very heavy crop. Its quality and appearance (after brushing) is equal or superior to any variety tested. Carlot shipments have amply proved the variety's Shipping qualities. This variety was found by a commercial cannery to be very satisfactory to handle in canning operations. A possible fault has been its tendency to show growth cracks at the beginning of the ripening season under conditions of excess moisture. However, these cracks have largely been confined to fruit produced on weak trees. The heavy pubescence is also objectional on unbrushed fruit. This is a yellow freestone.

**REDELBERTA.** (July 18-24). The fruit of this variety tends to be disappointingly small. The color is such a deep red that it lacks attractiveness. It is not recommended for planting.

**POLLY.** (July 24-29). Seems to be a promising white freestone. It has a good size, color and quality, but cannot be recommended because of lack of observation.

**MARLATE.** (July 24-29).

**MARK-BERTA.** (July 24-28).

three varieties are all Elberta type, yellow freestones. From limited observation it is difficult to distinguish between the three varieties.

**ELBERTA SUPREME.** (July 28-31). Apparently a very good strain of Elberta but has not ripened earlier than regular Elberta as stated by originator.

**FRANKIE.** (July 28- ). A yellow freestone of fair size, color and general appearance.

**GOLDEN ELBERTA CLING.** (July 28-August 3). This is a very good cling having Elberta characteristics, is attractive in appearance, and grows to good size with firm, rubbery, fine grained flesh of excellent color. This is preferable to Japan Cling of similar ripening date.

**SHIPPER'S LATE RED.** (July 28-August 6). Very highly colored peach of good quality and grows to good size. It should be very satisfactory variety to follow Elberta.

**WHITE HALE.** (July 29-Aug. 6). Ripens one week later than Elberta and is recommended to growers desiring a white freestone of this season. Tree bears heavy crops of uniform, large sized peaches. Its attractive color develops well before ripening, and its edible qualities are considered very good.

**AFTERGLOW.** (Aug. 6- ). A yellow freestone of rather dry flesh and only fair quality. It does not have the Elberta characteristics. This variety is unattractive in appearance and tends to fall from tree before ripening.

#### —THE AGRARIAN—

Exchanging scrub sires for purebred is worth more than it cost.—Bryan.

#### CLEMSON COLLEGE

#### ROADSIDE MARKET

Open April 15 to December 15

We sell over 100 varieties of peaches and many varieties of apples, grapes, plums, cherries, raspberries, pecans, cider and canned ripe yellow freestone peaches, green asparagus and frozen peaches and asparagus.

Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

**THE HORTICULTURE DEPARTMENT**

# Beef Production in S. C.?

By R. W. Touchberry, '44

*Beef cattle can bring Profits in South Carolina*



COURTESY S. C. EXTENSION SERVICE

**The education of farm youth is a means of more beef production in South Carolina for the future.**

Not so many years ago there were few fed cattle. Herds were left to graze on the open range. The Texas Longhorn steer was a product of this period and environment. These Texas cattle were well armed with sharp horns to repel enemies and were gaunt and lean because of the rigors of weather and feed. Huge herds of such cattle were driven on the long trail across the sun prairies to markets in the central west. During this period the consumers had little choice in the matter of quality of beef; they took what was offered. Quality, as it is known today was a secondary consideration. One never knew whether a steak would be tasty and tender or tough and stringy.

The advent of livestock transportation by rail and later by truck, the consumer's demand for finer textured, well marbled meat, and the gradual perfecting of technique caused an almost complete change in the beef cattle industry. Farsighted breeders began to import stock from England and Scotland to cross with native animals. From this beginning there has been the gradual evolution of the beef animal. By far, the largest part of the cattle now coming to market is fed stock. Originating in the range states, the cattle are shipped to the grain belt where cattle feeders take them in hand to put on weight, give them conformation and proper marbling.

The technique of feeding cattle is not developing in South Carolina as it should. We have imported from other regions quite a number of well developed breeding cattle. A review of the county and state fairs this fall shows that the cattle are superior in quality to those of a few years ago. This is a great im-

provement but we still haven't advanced enough. Most farmers sell their steers much too small and before they are properly conditioned. They do not feed the cattle long enough. With the cheap feed we can produce in South Carolina and with the mild climate and cheap labor we should be able to feed and fatten cattle profitably.

To feed cattle profitably it is beneficial that farmers have knowledge of good cattle management and feeding practices. The cattle feeders must know the food requirements of feeder cattle and they must know the most economical sources of these food requirements. Many common methods all have to be done away with and new, simpler, and far more economical methods will have to be substituted. South Carolina is endowed with a good climate; and cheap feed can be easily grown. The farmers of South Carolina should "cash in" on such advantages.

When practical knowledge is combined with breeding and feeding, South Carolina should progress as a cattle producing state.

—THE AGRARIAN—

The first commandment of farming: Thou shalt not let thy land get poor.

—THE AGRARIAN—

Pines on idle lands will make them no longer idle and unprofitable.

—THE AGRARIAN—

For the land's sake, don't neglect the terraces in the face of the winter rains.

—THE AGRARIAN—

Switch the lazy hens—switch them from the chicken yard to the dinner table.





# Garden Irrigation in S. C.

By St. Clair Knight

*Irrigation helps the farmer carry his crops through droughts.*

Thousands of farm families in South Carolina could have better gardens by utilizing water from wells, springs, streams, or ponds for irrigation during dry spells. The hesitancy on the part of our people to develop irrigation can be attributed to the lack of information. The advantages of supplemental irrigation have not been presented clearly or thoroughly. The average farm citizen treats the matter rather nonchalantly because he feels that someone is only trying to elaborate on a new subject that has no connection with his business. In the light of these circumstances the author shall attempt to divulge some general information relative to irrigation in South Carolina.

The primary purpose of irrigation is to maintain an adequate amount of moisture in the soil around the roots of plants, and this can only be done by an efficient method of application. Resultant crop yields depend for the most part on the uniform distribution at the right time of the proper amount of water to the soil. Crops are irrigated in various ways, the most important methods being: spray or overhead, flood, basin or check, border or furrow irrigation. The system best suited depends upon the seasonal rainfall, the slope and general character of the ground surface, the water supply, kind of crop to be grown, soil type, and the porosity or imperviousness of the subsoil. To these can be added the question of cost, economy, and permanency.

The average rainfall in South Carolina ranges from 46 to 48 inches per year. Even 20 inches of rain may meet the water requirements of many crops, but the factor of distribution enters into the results. In the Piedmont, the heaviest period of precipitation is late fall, winter, and early spring. Our major crops are not growing then; therefore, they do not receive the benefit of it. During mid-summer and early fall precipitation is the lightest. Thus we can see the necessity of maintaining a source of water to replenish the depleted moisture effected by short periods of drouth on shallow rooted crops. Irrigation can be thought of then as a form of insurance against complete loss.

Taking in consideration the above factors, the number of important methods in South Carolina can be narrowed down to two. The spray or overhead method seems to have the edge with furrow in popularity or feasibility. With the spray system it is possible to apply small amounts of water during dry spells without increasing the risk of putting on too much prior to a heavy rain or of damaging truck crops by running water through the rows.

The furrow method can not be used in the Piedmont where there is a rolling topography. With this method the factor of control enters as the chief problem. This problem can be handled by the proper cultivation and preparation of the soil before the water

is released and by the use of flumes with check gates to release it. The soil must be evenly broken and pulverized before the water is allowed to cover the plot or there will be uneven distribution over the surface. This results in some plants getting moisture while others do not. Again it is all important that a wooden or concrete flume be placed at the head of the rows with check gates. This flume will insure the conduction of an equal amount of water in each furrow or row through the check gates.

As the final determination, it can be said that supplemental irrigation helps the farmer carry his crops through those minor or major droughts which occur even in localities where the average annual rainfall is adequate for the production of satisfactory crops. Its use increasing, although for financial reasons it is confined largely to the higher priced garden and orchard crops.

—THE AGRARIAN—

## Did You Know?

1. that the average length of a person's life in South Carolina is 55.76 years, which is longer than the corresponding length of life in Illinois, California, Pennsylvania, or New York?
2. that South Carolina has the smallest number of foreigners of any state in the Union?
3. that Branchville, South Carolina is the oldest railroad junction and has the oldest railroad eating house in the world?
4. that South Carolina is almost exactly the same size of Scotland?
5. that of the 48 states in the union, South Carolina ranks 17th in density of population?
6. that Piedmont is derived from the Latin word *pes*, meaning foot, and *mons*, meaning mountain and means "at the foot of the mountains?"
7. that Sassafras mountain in Pickens county is 3,548 feet above sea level and is the highest peak in South Carolina?
8. that fertilizer industry of the United States had its beginning in this state?
9. that brick from Sumter County has been used by architects in buildings all over the United States?
10. that South Carolina holds the world's record for the amount of corn grown on one acre?
11. that nearly \$100,000 worth of gold was mined in South Carolina in 1905?



# Symbol of a World Set Free



Not until long after Philadelphia's Liberty Bell had clanged and cracked was this humble bell heard. It is the dinner bell on an old farmhouse in Illinois. Its voice is a call to eat, to abundance of hearty, wholesome food. It means more than ample fare for a farm family. This bell is the symbol of a system of farming which for the first time in human history can produce plenty of food for all of the people all of the time. Its valiant ring proclaims freedom to farmers from serf-like drudgery for a peasant's pittance.

Before this, no nation ever had been free from famine. For hundreds of years, the average in England was ten years of famine in each century. In Europe, whole cities were well-nigh wiped out as pestilence finished the ghastly work of starvation. That was in lands whose soils still produce more per acre than the average in America. When the first colonists came here they had all the wealth of a new world beneath their feet. Yet half their people died for lack of proper food.

Neither richness of soil nor abundance of acres has ever

of itself spared mankind from danger of death by hunger.

In the American way of farming hybrid corn and high-bred livestock, inoculated legumes and chemical fertilizers all do their bit to add production per acre. *But it is farm machinery that multiplies production per man and puts plenty in the place of scarcity.*

For less than five per cent of farm income, farm machines enable the farm family to feed itself and three other American families, to furnish fiber for most of their clothing, and still leave a huge surplus for export or for the miracles of chemurgy. By freeing those other three families to create music and movies, automobiles and radios, high schools and hospitals, farm machinery gives us all our material blessings.

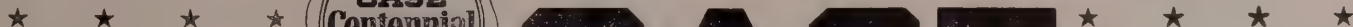
For a hundred years the American system of free enterprise has given us new and improved machines so thick and fast that it was good business to discard the old and replace with new. *We dare not do that now.* Every machine, new and old, must be kept fighting to its full capacity on the food front. To win the battle of food despite less and less of farm help, we must make machinery do more and more.

## Speeding the Day of Victory

To meet the need for munitions, Case factories now are producing large amounts of war materiel. Case industrial tractors, too, are being built for the armed services, air fields, ship yards, docks, defense plants and other war agencies. Similar help with the war effort is provided by Case farm tractors, combines, and other machines. They multiply crop-producing capacity per man and help maintain food production despite depletion of farm manpower. On both the military front and the food front their performance reflects the endurance which has been a Case principle for a hundred years. J. I. Case Co., Racine, Wis.



# CASE







# The Conservation of Nitrogen

By W. H. Eaddy, '44

Nitrogen is one of the most important basic elements known at the present time. It is a constituent of explosives used to a great extent in our present crisis. Due to its vital importance in making war munitions and for growing crops, we are now threatened with a shortage of this element.

We must attempt to increase or restore our present supply. The main supply is drawn from nitrogen compounds in the soil. If these are lacking, the compounds are supplied by fertilizing with nitrate of soda obtained from a commercial product. The use of this inorganic fertilizer has become almost imperative for the production of many crops.

Loss of nitrogen by leaching is of grave importance. Very little leaching occurs in our forest and heavily vegetative land. Trees and other vegetation return the nitrogen they assimilate by their product and finally parent material. This is nature's way of conserving and providing available nitrogen to her plants. The losses are much greater in the way we produce cultivated crops, but do not require more nitrogen than areas of thickly vegetative spots. Losses occur now under our present agriculture which never take place under natural conditions.

Only a small portion of our total nitrogen is lost by leaching. By gradually depleting our soil of this element, it becomes necessary to use commercial fertilizer.

Nitrogen and other necessary elements are present in manure. Manure effects the soil physically, chemically, and biologically. In addition to nitrogen, phosphorus, and potash, many of the so-called minor, but often very important plant foods are increased in the soil. Many desirable strains of soil bacteria such as legume bacteria are created.

When farm animals do not supply enough manure, a synthetic product is used. This synthetic product is spoken of as artificial farm manure. The following method may be used in producing this manure as recommended by Circular 214. (1) Use all excess litter such as straw, leaves, and crop residues. (2) Build compost pen with logs or boards. Good foundation walls mean better manure. (3) Mix 10 pounds ammonium sulphate, 50 pounds of limestone, 20 pounds of superphosphate, and 20 pounds of muriate of potash. (4) Pack down litter on foot deep, using 50 pounds of fertilizer mixture per ton of dry litter. A few shovelfuls of animal manure tend to add necessary bacteria. Keep the pile wet with water and continue this process until the pile is 6 ft. high. The center of the pile should be lower than the edges and the sides straight. The pile should not be built higher than normal rainfall can penetrate. Synthetic manure is very effective and is used more than ever before.

Growing cover crops will conserve nitrogen before it is plowed under. Besides controlling nitrate losses many other benefits occur; it controls erosion to some extent, it adds organic matter to soil, and improves the physical condition.

Nitrate losses are greater on bare land than on soil growing sod-forming plants. Nitrates remain in the soil after row crops are gathered. A crop should be grown during the winter months to utilize this nitrate before it is leached out.

Farmers who are now producing good leguminous crops need little or no nitrogen for small grain. This is the most effective way of meeting any shortage of nitrogen. Most crops demand fertilizer for economic production. The fact is that the present emergency may last for years. The farmers who are more or less dependent upon this element should strive to seek a way to gain their needs.

In our cultivated crops such as tobacco, cotton and vegetables, nitrogen is taken from the soil with little or no prospect of returning it. Yearly removal of our best nitrogen that the soil contains cannot long continue. Leaching and erosion also deplete our soil by taking a large percentage of the total nitrogen. In order to produce these products which are so much benefited by available nitrogen, we must consider this present shortage as a definite problem.

—THE AGRARIAN—

The chief trouble about deep plowing—there isn't enough of it.—Bryan.

FOR MEN'S WEAR SEE

**HOKE SLOAN**

HE KNOWS WHAT'S RIGHT

**THE ANIMAL HUSBANDRY  
DEPARTMENT**

of

**CLEMSON COLLEGE**

**Purebred**

Berkshire Swine

Polled Hereford Cattle

Hampshire and Southdown Sheep

# Canned Foods and the War

By J. A. Mixon, '43

"Praise the Lord," and pass the food.



COURTESY S. C. EXTENSION SERVICE

Home preserved foods in glass containers assures an



COURTESY S. C. EXTENSION SERVICE

adequate supply of tin containers for our armed forces

Generations ago on the advent of a war, nations so involved would beat their plowshares into swords and go forth to battle. Today the food producers of this great democracy need to sharpen their plowshares to expedite all-out-production. One often hears the slogan "Food Will Win the War." Of course, food alone cannot accomplish the end, but the nation that can continuously supply its fighting forces with adequate food will have a distinct advantage.

Anyone who is familiar with military tactics will not deny that the service and supply arms are as essential to winning the war as the actual combat forces. Bataan did not fall because our forces became exhausted from continuous combat. No, with the proper foods as a source of energy and as a barrier for diseases, and with an inexhaustible supply of ammunition, those gallant defenders would be fighting yet.

The job of feeding men who are far from sources of food creates a problem which can be partially solved by safe, scientific methods of preserving foods. Thus, for such purposes the canning industry has grown and developed. In the winter of 1795, Napoleon's Army and Navy were facing disaster as a result of a rage of scurvy which was caused by a deficiency of fruits and vegetables, and as a result Napoleon offered an award of 12,000 francs for an improved method of preserving food. Nicholaz Appert, a French brewer, achieved the award by his successful experiment.

Today the Army and Navy of the United States is counting on canned foods to help feed men in the services, and the canning industry is better prepared than ever to meet this challenge. There are sufficient canneries in the United States to preserve enough food for our fighting forces and domestic consumption. If there is a shortage of canned foods, it will probably be because the vegetable and fruit growers have not increased their production enough to meet the increased demand. Of course, there remains the possibility that there may be an underproduction because of a shortage of tin available for such purposes.

Some will argue that there should not be an increase in the demand for canned goods since the increase in personnel of the Armed Forces will result in a corresponding decrease in civilian population. The fact remains, however, that the proportion of canned foods to total foods consumed by the service men is much greater than civilian consumption.

Fruit and vegetable farmers who produce their crops primarily for canneries can help assure an adequate supply of canned foods by producing to capacity. Other farmers, and civilians as well, who are located far from canneries can contribute to the effort of assuring an adequate supply by preserving more foods, and using glass containers in preference to tin containers.

With the proper support from farmers and housewives, the canneries of America can and will make a great contribution toward winning the war.





Dr. Rudolph Nagy, research engineer at the Westinghouse Lamp Division, showing how milk bottles, with the aid of ultraviolet rays of the Sterilamp, can be made completely sterile. A U-shaped Sterilamp is inserted into the bottle and the ultra-violet rays kill all bacteria within ten seconds.

—THE AGRARIAN—

The most important thing about farming, after all, is the people on the farm and their problems.

—THE AGRARIAN—

The farmer who buys all that he consumes is neither a good farmer nor a good business man.

—THE AGRARIAN—

Reading farm publications will reduce cost of ignorant farming.

—THE AGRARIAN—

Good farmers are not found on poor land. Which is cause and which is effect?

# The American Farmer and the War

By A. S. Waldron, '44

Upon you, Mr. American farmers, rests the question of victory or defeat. It is true this is everybody's war but the American farmer plays one of the most important parts. Never before has the American farmer been recognized as he is in the present crisis. Guns and shells, ships and planes, cannot be effective without farm products. Many vital war materials can only be made with farm-grown ingredients. This year, even with the greatest production of all times, there is none too much.

Food is the most essential of all war goods, for it is a known fact that an army moves on its stomach. America is self-sufficient and independent of the rest of the world except for a few non-essential foods. We are the only nation who can boast such a fortune. Therefore, it becomes not only the American farmers' task to feed our busy millions, but also to help feed our allies. The fact that American agriculture is equipped and organized to do the job has already been proven in this war. "Food will win the war" is no idle slogan, for science has proven that proper nutrition is necessary for maintenance of strength and morale among both military and civilian forces in prolonged total war.

Farm products are created only by work. The draft is taking many of our strongest and ablest young farmers. War industries, offering higher wages for shorter hours and simpler work, are taking even a larger number. Those who are left must work, and their muscles must be increased by machinery. Already women are taking their places beside men on the farm. With the aid of better farm machinery, they will help in keeping, or even increasing, our present records of production.

Along with producing food and other essential war materials, the American farmer must back his nation from a financial standpoint. This can be done by buying war bonds and stamps. Remember to make every market day your bond day and to buy every time you sell. It's true that no armies trample your crops; no shells plow up your fields; no planes roar down on your home—yet in this war victory begins on the farm.

—THE AGRARIAN—

## DEHYDRATED FOODS

Continued from page 4

one measure to insure our victory, we should send to our armed forces throughout the world the best food available, prepared in such a manner to insure its' highest nutritive value. Since dehydrated foods may be stored a long time, shipped most advantageously, and prepared in such a way that it is very hard to distinguish it from the fresh product when it is ready to serve, dehydrated foods will play an important part, not only in feeding our armed forces, but also in meeting the demand of American public in general.

## College Cafe and Sandwich Shop

WHERE THE CLEMSON CADETS  
MEET AND EAT

—FINEST AT CLEMSON—





# Women Join the *"Field Artillery"*

as International Harvester Dealers

Teach Power Farming to an Army of "TRACTORETTE"

THE SUN is just over the ridge. Breakfast is just under the belt. The farmer and his helpers sample the breeze as they stand on the back steps, and the farmer says:

"I've got to go into town this morning and I'll be gone a while. Meantime, Emily, you and Ruth might as well start in on the south forty."

Emily? Ruth? Girls? Sure, why not? For Emily and Ruth are Tractorettes . . . and they know their stuff. They'll check their tractors for fuel and lubrication. They'll make those minor engine adjustments they noted mentally last night. They'll roll out early and do a first class job of field work, straight down the rows.

## What is a Tractorette?

A TRACTORETTE is a farm girl or woman who wants to help win the battle of the land, to help provide Food for Freedom. She is the farm model of the girl who is driving an ambulance or running a turret lathe in the

city. Like her city sisters, she has had the benefit of special training.

Late last winter International Harvester dealers began to train this summer's Tractorettes. The dealers provided classrooms, instructors, and machines. The Harvester company furnished teaching manuals, slide films, mechanical diagrams, and service charts. The girls themselves were required to bring only two things—the will to work and a complete disregard for grease under the fingernails or oil smudges on the nose.

They studied motors and transmissions, cooling systems, and ignition. They studied service care. They learned to drive tractors. They learned to attach the major farm implements that are used with tractors. And they were painstakingly taught *the safe way* to do everything.

Today, on their family farms or elsewhere, thousands of "graduates" of these emergency schools are doing a real job for victory. Tractorettes are

working to provide the food that is a vital weapon in the war that America wages. They are doing the farm work that used to be done by boys who now are flying bombers or riding the slanting decks of a destroyer.

Their Tractorette training cost them nothing except the energy and intelligence which they put into it. The company conceived and launched the program. Its financial costs are shouldered by both the Harvester dealers and the company.

This fall and winter Tractorette training courses will be broadened to meet new needs as they arise. Thousands of new girls will take the course and join the "women's field artillery" next spring, fit and ready for the every-year battle of the land. Until Victory is won, Tractorette training will continue to be one of the important *extra* services gladly rendered by Harvester dealers, as typical American businessmen, to the farmers and to the nation.

INTERNATIONAL HARVESTER COMPANY  
180 North Michigan Ave., Chicago, Illinois

» BUY WAR BONDS  
» TURN IN YOUR SCRAP  
» SHARE YOUR CAR

# INTERNATIONAL HARVESTER



THEY'RE Milder  
ALL WAYS —

THEY DON'T TIRE  
MY TASTE —

**THERE'S NOTHING LIKE  
A CAMEL!**



# Camel

*the cigarette of Costlier Tobaccos*

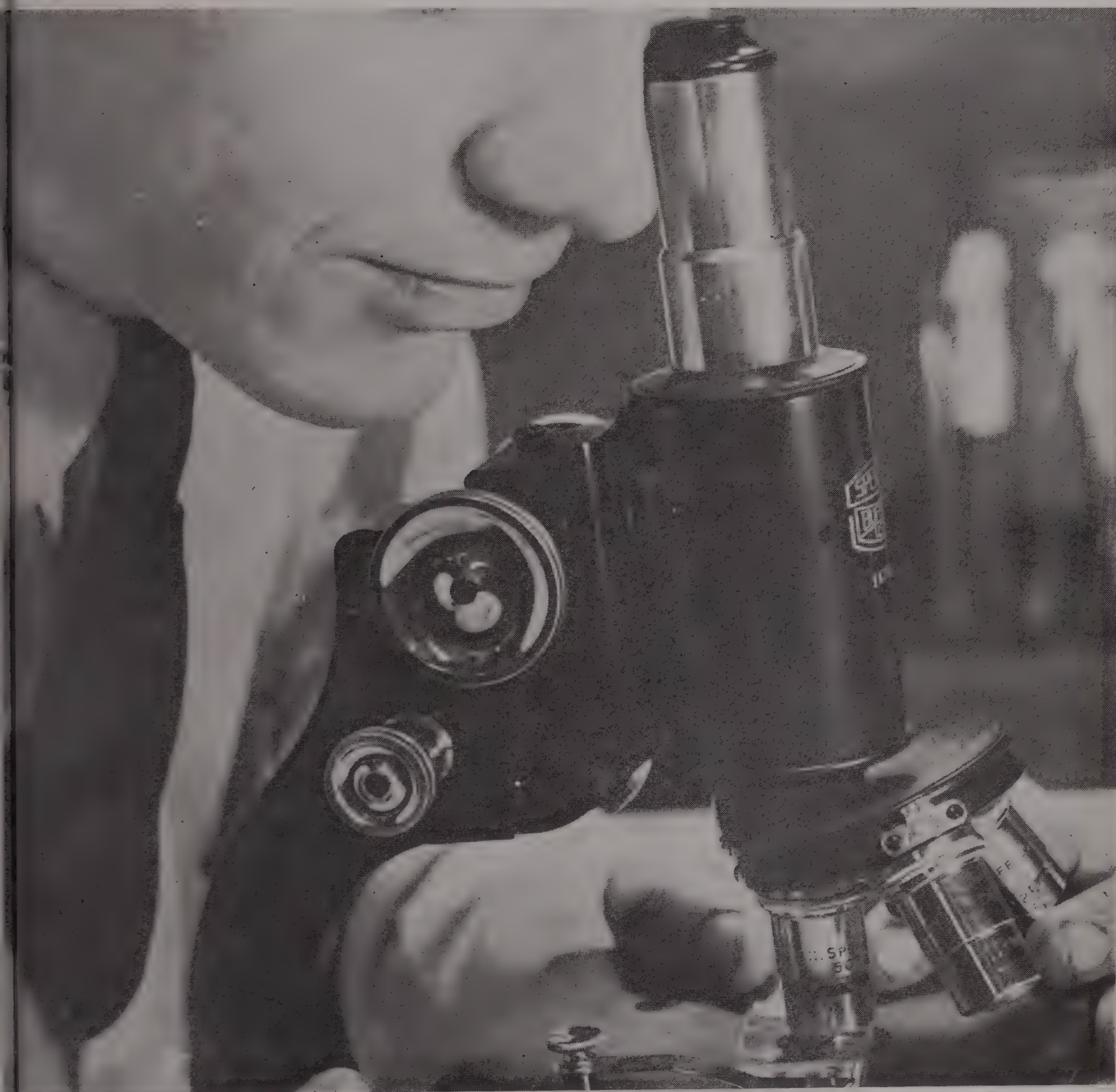


H. J. Reynolds Tobacco Company  
Winston-Salem, North Carolina



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THE CLEMSON AGRICULTURAL COLLEGE



Science in Agriculture

**Clemson, S. C.      December, 1942**

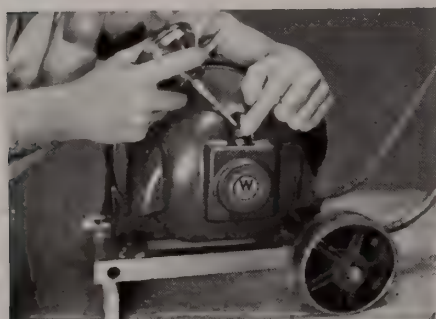


# Farm Equipment may have to last for the duration ... learn to take good care of it!

Since it will be difficult to replace farm equipment for the duration, it's up to American farmers to take the best possible care of their tools of food production. Students can be of great help in assisting in this vital work.

By doing this, they not only help conserve critical war materials... they help assure an uninterrupted supply of foodstuffs to our fighting forces.

Here are practical pointers which will help farmers add years to the life of their electric motors... and make farm equipment last longer and do more work.



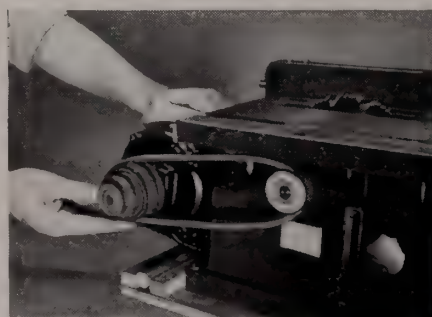
**Lubricate correctly...** Use lubricants sparingly. Avoid over-oiling, as this may injure insulation. Do not oil bearings while motor is running. Wipe off spilled oil. Inspect oil supply regularly and keep to proper level. Check ball bearings once a year... housing should be kept one third to one half full of special ball-bearing grease. *Never use ordinary cup grease.*



**Keep commutators clean...** If brushes spark, commutators may be worn or dirty. Clean by gently pressing 2/0 sandpaper, attached to stick, against commutator while motor is running. This will polish commutator bars and improve brush contact. *Never use emery cloth.* If commutator is worn in ridges or out of round, have armature removed and commutator turned down by experienced repair man.

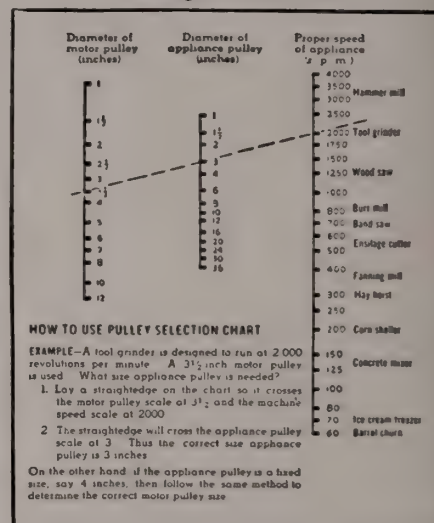


**Protect motor windings...** Dirt in windings restricts ventilation and ability of motor to cool itself. Clean the motor windings occasionally with vacuum cleaner or air hose. Proper location or shielding of motors will help keep them clean and dry. Totally enclosed motors should be used where excessive moisture, hazardous dust, or explosive vapors are present.



**Avoid overloading motor...** Heat caused by excessive or continuous overload may destroy motor windings and bearings. Temporary overload will do no harm if motor is allowed to cool off during normal operation. Overload protective devices should be added if not built into motor. Motors should be carefully applied to job. Often the motor load may be reduced by changing pulleys.

Pulley Selection Chart for use with Electric motors running at 1750 R. P. M.



Adapted from Georgia Farm Bulletin 467

**For longer life and greater production,** farm equipment should be inspected regularly and kept in the best possible condition. Knives should be kept sharp and properly adjusted. Shafts should be correctly aligned and bearings well lubricated.

Proper operating speeds are important... for excessive speed is not only dangerous, but wastes power and may destroy the machine. This can be avoided by proper selection of pulleys, as explained in the chart above. Manufacturers' recommendations for machine and belt speeds should be carefully followed at all times.

## GET THIS FREE LITERATURE!

● We will be glad to send you a free booklet, "FARM MOTORS," which gives valuable information on the selection, care, and use of electric motors. We will also send any of 12 free Farm Bulletins describing the wartime use of electricity on the farm. Just check the ones you want and mail the coupon, now.



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# The Agrarian

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No. 2

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## OUR COVER

Our cover picture was photographed by Mr. J. A. Smith, extension photographer. It shows a junior agricultural student in a bacteriology laboratory here at Clemson making an examination of a bacteriological preparation.

The slow development of the science of agriculture was due to the lack of suitable microscope.

Antony van Leeuwenhoek was the world's first great microscopist. By 1783 he had developed a microscope with a magnification of 300 diameters.

In 1844 Dolland developed the principle of the oil immersion objective. This development gave a marked increase in the magnifying power of the microscope.

In 1870 Abbe developed the sub-stage condenser. This device is a supplementary lens located beneath the stage of the microscope for the purpose of converging the rays of light from the mirror, thus giving a much better illumination than that previously had. At the present time the modern daylight microscope has a magnification of approximately 3000 diameters.

Without the microscope the important soil processes of ammonification, nitrification, and nitrogen fixation would probably have never been worked out. Nitrogen, generally speaking, is the limiting factor of crop production, and an understanding of the above processes is extremely important in agriculture.

After the development of the microscope we learned how to determine the numbers and types of microorganisms in the soil and the conditions favoring the growth of the various important physiological groups. In the last analysis the development of modern agriculture has depended as largely on the microscope as has the development of the science of medicine.

## REGRETS

At present, there is an increasing possibility of the army taking over some 250 colleges in the nation's war effort. Schools in which such a system will be used have not been designated by the War Department. However, Clemson officials feel certain that Clemson will be included, as it has been ranked as a distinguished military college for many years.

In the event that Clemson is taken over by the army for special training of soldiers, it will be impossible to continue with the publication of the Agrarian. It is the retiring staff's sincerest hopes that the Agrarian may not reach a permanent ending, but that it will always find a place in the Clemson tradition.

Although we contemplate this issue as being the last one for sometime, a new staff will be appointed to continue publication in case it is deemed practical in the future.

We wish to express our gratitude to our advertisers, faculty and all others who have made the publication of the Agrarian possible.





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# THE WAR AND THEN...

Guest Editorial - - - By D. W. Watkins

Discussion as to what life will be like after the war seems to be useless to many people. Nevertheless if during the first world war people everywhere had thought more about the postwar world it would not necessarily have slowed down the war activities and it might have saved the peace.

There was a plan for the peace following the first world war however not enough people in the world understood it to make it a people's plan. They had not talked much nor thought much about anything except winning the war and holding their individual places in a world assumed to be stable henceforth. It was too late to begin discussing peace and so making it a people's peace after the war had ended, and nations as well as organized groups within nations appropriated the peace to their selfish uses.

Most thinkers on this subject divide the period we are discussing into three parts: (1) the war, (2) immediate postwar period, and (3) postwar period after adjustment back to peace. Until the war ends much money will be in circulation constituting a pressure for goods. Just recently Leon Henderson was advising a system whereby people could buy certificates to be cashed in for semi-durable goods as soon as possible after the war. The basic idea is to relieve the present buying pressure caused by a scarcity of goods and a large circulation of cash money. Let us assume in line with the President's expressed hope that the war will end successfully for the Allies in 1944. A recent survey by Slichter, published in the Harvard Business Review, estimates that this "deferred demand" in the United States will by the middle of 1944 amount to fully 25 billion dollars worth of goods and things, while abroad it will amount to 40 billion dollars. Some think it will take a year to supply this deferred demand and others that it will take as many years after the war as the war itself lasts. This is the period which is most dangerous from the standpoint of inflation.



D. W. Watkins, director of  
Clemson Agricultural Extension  
Service.

Between the first world war armistice and the middle of 1920 such an inflation set the stage for bankrupting many thousands of farmers who incurred debts then that had to be paid or foreclosed later.

During the immediate postwar period the production of goods will gradually catch up with the current buying power of the population of this and other countries. When this occurs we shall pass into the third postwar period mentioned above. Then unless controls are effective there will be a business recession. Ordinarily this will be characterized first of all by a sudden drop in the prices of farm commodities. Before that time, however, farm prices, unless arbitrarily controlled, are likely to be as high as the general price level. This suggests two ideas: (1) to apply price controls to farm products and thereby keep them abnormally low during and immediately after the war will mean a shortage of such products which will last until a business depression equalizes the controlled price with the price based on demand; and (2) because of the many uncertainties involved the safest course for the individual farmer is usually to incur only such debts as may be paid currently and to pay off old standing debts as opportunity permits.

Will tariffs be lowered after this war? This subject needs to be carefully re-analyzed by capital and labor, not only from our standpoint as a creditor nation and as a key problem in future world peace, but also from the future self interest of all concerned.

Many postwar factors cannot be discussed here, but a few of them are worthy of mentioning. Cheaper synthetic nitrogen fertilizers will boost agriculture in this area in the third period. However cotton, now a world crop not a southern monopoly, will not pay as well as the production of some other crops on such soils as are suited to the production of these other crops. The trends to other types of farming already under way will be hastened. Mechanization of agriculture with family-sized tractors and improved equipment is bound to grow rapidly. Farm electrification of which we have had a taste will be completed and highly utilized. Home refrigerated foods will gradually replace home canned foods, and foods generally will be appreciated more for their protective and health values. Livestock and farm feeds of more efficient types and varieties will come into common use. Family farming will require more operating capital. Farm people will cease to be isolated and will further develop group organization by exchanging some fancied freedom for a chance to sit at the economic table with labor and capital. Such group organization, however, both among labor and farm people should tend to fall more and more within the framework of the general welfare rather than be of a narrowly selfish type.





# A Poland China Breeder

By T. C. Moss, '43

*Mr. Moss says, "In raising hogs one must strive to raise the most number of pounds of pork in the shortest period of time on the least amount of feed."*

Three miles northeast of Cameron, South Carolina, is located the farm of T. C. Moss. As his father before him, Mr. Moss not only advocates but practices diversified farming.

Since 1932 the Government has cut the cotton acreage considerably and thus caused thousands of acres of land in the South to be thrown out or to be used for other purposes. There seems to be no better way to utilize this land than to grow feeds to feed well bred livestock.

When the change in southern agriculture came, Mr. Moss had no trouble whatsoever of making his farm fit into the new program. Twenty-seven years ago Mr. Moss had decided that he wanted a purebred hog to market his home grown grain, and ever since he has been working to improve and better the hog in southern agriculture. He selected the Poland China breed because he thought that this breed had more possibilities of being what both the breeder and farmer wanted and needed.

Mr. Moss realized that there was no use to begin a herd without a sound foundation. He knew that "blood would tell" and that a strong individual tended to produce a strong individual. He bought his first Poland China sow from C. C. Porter, Plattsburg, Missouri. This sow was sired by Liberator and out of Harrison's Big Bob. She raised eight pigs, and it was this litter that laid the foundation of Mr. Moss's herd.

Mr. Moss believes in line breeding and the same type and same line of breeding has been constantly used in his herd.

Upon this solid foundation Mr. Moss has built up his herd of Poland Chinas to such an extent that it is considered one of the best in the South.

For a number of years his herd went on a show circuit covering ten state fairs—beginning at the Maryland State Fair, going as far west as the Kentucky State Fair, down to the Southeastern Fair at Atlanta and winding up at the State Fair in Columbia. He always won his full share of blue ribbons. An exceptional record was made by a boar, Pioneer's Best 2nd, who was made grand champion at nine out of the ten state fairs. This boar was a direct descendant of the herd's first blood line. For the past few years his showings have been exclusively on barrows. For the past two years at the Florence Fat Stock Show in Florence, South Carolina, his barrows have won most of the firsts and all championships, including both reserve and grand champions. The past year the reserve champion barrow weighed two hundred pounds on the day that he was five months old.



**Poland China Sow bred by T. C. Moss, Sr., Cameron, S. C.**  
COURTESY S. C. EXTENSION SERVICE

Mr. Moss emphasizes feeding. He grows all of his feed except the protein supplement and the constituents for the mineral mixture he feeds. His chief feeds are corn, oats, wheat, pasture, protein supplement and a mineral mixture. He has found that hulled oats is an exceptionally good feed for pigs just weaned. A balanced diet is essential.

A few years ago Mr. Moss was awarded a Master Farmer Degree. His work and constructive breeding with his herd of Poland China hogs was one large reason why he got this award. Mr. Moss has also been awarded a Certificate of Merit by Clemson College for the work he has done with hogs.

Mr. Moss advocates sanitation in the raising of hogs. Many people think that the hog is the dirtiest of all animals, but quite on the contrary, the hog is the cleanest of all animals. "Clean lots, rotation of lots, grazing, plenty of fresh water and clean farrowing pens are essential," says Mr. Moss.

In the past few years Mr. Moss's herd has been headed by such outstanding individuals as Admiration Mixer and Monarch. These boars combine the greatest bloodlines in Poland China breeding. As has been his practice in the past, Mr. Moss will again hold a bred gilt sale on the first Wednesday in February.

Mr. Moss's choicest bit of advice to the hog raiser and breeder is, "Remember the purpose of the hog is to market home grown feed and that eighty per cent of the cost of the hog is the feed he consumes. Always remember that the ultimate end of the hog is the pork barrel, so strive to raise the most number of pounds of pork in the shortest period of time on the least amount of feed."

# Dehydration In The Home

*Dehydration Experiments Are Now Revealing Some Of Its Practical Applications In The Home*

By H. S. Cotton, '43



**An experimental dehydrator designed and built for home use.**

Drying is one of the oldest known methods of food preservation. There are no definite records of when it first was used, but history shows that it was used in the ancient times to some extent. Early settlers of this country dried most of their food so that they could store it away for use when fresh food was not available. Ice boxes, refrigerators, etc. were not heard of then. They could not use glass containers to can food in because they had very few glass containers and what they did have were used for other purposes. Canning in tin was not heard of at that time; so therefore, it was out of the question. Since that time, the more modern methods mentioned above have been the prevailing ones. Now that we feel a shortage of vital materials in these modern processes, such as rubber, glass, tin, zinc, etc., we are again turning to ideas of ancient times.

There are many methods of preserving perishable and semi-perishable foods. Among these are drying, canning, freezing and storing, each of which has a sub-division. Drying may be done by sun drying or evaporation by heating. Both are very effective but each has its advantages and disadvantages. Canning in glass or in tin is very effective and relatively cheap, but with the scarcity, of rubber, glass, tin, and zinc, it will have to be limited to a great extent. Products in glass and tin are very convenient and are relatively easy to store and handle. Freezing is not as favorable as drying or canning because of the great amount of space and expensive equipment needed. Storing in community freezers involves a lot of excess handling of food and adds expense of carrying food to and from the freezing plant. It is also inconvenient to people that live for some distance from the plant. Other factors that

determine which method is used in preserving the food depend upon the nature of the product. Asparagus should not be dried, potatoes can be kept without canning, peas should not be stored, and cabbage is not adapted to freezing. Some of these products can be preserved by two or more of these methods, so therefore, the method used is left up to the individual desires, governed by the time and equipment available and personal preferences.

After taking all of the above facts into consideration, any method of preserving food which eliminates or reduces the need for such items as are essential for other needs is worth careful consideration. The equipment needed for drying is not expensive and can be built by anyone who can use a hammer and saw, provided he does not go to the extreme in trying to get 100 per cent efficiency from the equipment.

Why do we dry our foods? First, to cut down on growth of bacteria and molds which are the two main causes of spoilage in raw food. If the water is removed, the growth of these bacteria is prevented. Drying is one of the most effective methods but must be done correctly so that a palatable and nutritive product is obtained. Best results come from exposing the food to dry air having a sufficiently high temperature as to assume fairly rapid drying, but not so high as to cook or scorch. The success of drying depends upon four things: (1) The quality of the product to be dried; (2) The protection of the product against dust and insects while drying; (3) The completeness and speed of the drying; and (4) The correct storage of the dried product. Drying should not be considered a method of utilizing inferior products. If they are not good enough to can, freeze, or use fresh, they are not good enough to dry. Food that is to be dried needs just as careful preparation as if it were to be canned or frozen. Better results are obtained when the product is brought directly from the orchard or garden, correctly prepared, and dried in the shortest possible time. Finally, we dry food to save the nutritive value and the original flavor. This can best be done by steaming the product for a few minutes before drying. Steaming also saves the soluble food material, checks the ripening process and also hastens the drying process.

Among the more common products dried, we find apples, apricots, cherries, peaches, peas, plums, figs, beans, corn, kale, pumpkin, okra, squash, parsley, celery leaves, and sage. Undoubtedly, there are other fruits and vegetables which may be dried but under the present conditions, it is doubtful whether the home maker should risk large quantities of other products as an experiment. Small trial amounts might well be dried, however, in anticipation of more extensive drying in the future.

There are two main factors involved in successful drying. These are: (1) The temperature of the

**Continued on next page**





air surrounding the product and (2) The rate of air movement. Warm, dry air moving over the exposed surfaces of the product to be dried will absorb moisture from it. The higher the temperature of the air, the more moisture will be absorbed; and the greater the air movement, the faster the moisture will be carried away. Air at a temperature of 82 degrees will carry over twice as much moisture as 62 degree air while air at 130 degrees has over eight times the moisture carrying capacity of 62 degree air. Experiments have shown that the most successful drying usually is accomplished when the air temperature is between 120 and 160 degrees. Temperatures below 120 degrees result in slow drying and permits a certain amount of deterioration to take place before the product is dried completely. Starting temperatures over 160 degrees may cause, to some extent, "cooking" which in turn results in an inferior product. Best results are obtained in most cases by starting the drying operation at about 135 degrees and if possible, gradually increasing the heat up to 160 degrees. This is not always possible but for products which require a high finishing temperature, a few moments in the oven after they have been removed from the drier will suffice. Too much heat at the start causes excessive drying of the outside surface, thereby, retarding evaporation of moisture from the inside. This is particularly true in the case of halved fruits.

There are two main methods of drying—one by utilizing the heat from the sun and the other by the use of artificial heat. Each of these two main methods has several variations. Adequate air movement is essential in both methods. One of the main causes of unsatisfactory drying is insufficient air movement and lack of uniformity of the air flow. All types of driers must be so constructed that the air moves over or through the entire tray or trays of food, and is not short circuited through any particular part of the drier.

Probably the simplest process is to expose the product to the direct rays of the sun on a screen covered frame supported so as to encourage the flow of air through it. Cover with screen or cheese cloth, to keep out dust and insects.

Effective drying can be done in this manner but it is the slowest of all methods. Success depends on several factors: first, the temperature must remain high and second, the air must be dry over a period of several days.

Heat from the sun can be utilized more effectively if trays of fruits or vegetables can be placed under glass with proper control of air circulation.

Artificial heat may be obtained for drying from the ordinary wood-coal kitchen range or even better by the use of electricity because a more even heat can be maintained and also because of continuous application of heat. This results in more rapid drying. It is also more convenient because it can be connected to any accessive convenience outlet.

Before storing dried products, they should be conditioned. This is done by placing the product into deep containers and stirring each day for eight or ten days. If food is too moist after conditioning, return to dryer.

Heat all products for 30 minutes at a temperature from 150 degrees F. to 180 degrees F. to protect from infestation by certain kinds of beetles and moths.

Fruits are ready to move from the drier when they are tough and leathery. Vegetables should be rigid and brittle. If in doubt as to whether material is dry enough, leave it in the drier a little longer, but at a reduced temperature. As long as the temperature is held low enough, there is not much danger of food becoming too dry.

Dried fruits and vegetables will keep for a year or longer if sealed in moisture proof containers and stored in a cool, dark, dry place. Examine the food occasionally. If there is any sign of moisture, reheat to 165 degrees and reseal.

Some of the best containers include glass jars, tin cans, tin boxes, or heavy paper and cloth bags dipped in parafin or beeswax.

Dried foods are best if containers are packed full and food used a short time after opening. For that reason, it is well to store food in small amounts.

To prepare the food for table use, soak for several hours or overnight in cold or warm water. Cook the food in the same water that it was soaked in. Simmer until tender, being careful not to boil, then prepare as described.

This information was gotten from Extension Circular 709, published by the University of Nebraska and from circular 216, published by Clemson College as prepared by the United States Department of Agriculture and from experiments made by the author.

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# Grain Sorghums for South Carolina

*A Profitable Substitute for Corn*

By J. B. Pate, '43



COURTESY S. C. EXTENSION SERVICE

**Sorghum such as this is far more drought resistant than corn.**

The average yield of corn in South Carolina is very low. There is need for a crop to be used as a substitute for corn. Grain sorghums may be the answer to this need. Barley is being grown in the place of corn in some instances, but barley requires a rather fertile soil to get maximum production. The low fertility level of South Carolina soils may be a limiting factor in the growing of barley.

Grain sorghums are known as the grain crop of the dry hot Southern Great Plains region of the United States, but it may be called an ideal corn substitute crop in all dry land regions or where a successful crop of corn cannot be produced. The total amount of rainfall in this state is uncertain, and the soils have a low water holding capacity. These factors often cause unsatisfactory yields of corn. Grain sorghums are more drought and heat resistant than corn, and they are capable of producing a good yield of grain in areas where corn cannot be grown.

Sorghums are generally divided into forage and grain sorghums. If grain is desired, the true grain sorghum varieties should be selected, and forage sorghums should be chosen for the production of forage. Sometimes a combination of forage and

grain is desired, and for these cases there are certain dual purpose selections which can be found to meet this need best.

In normal growth sorghums require as much water as corn. During periods of drought they go into a state of dormancy, and after rain they will resume growth. Corn does not have this ability and will fail during a drouth. Sorghums also have twice as many secondary roots per unit of primary roots as corn, although the number of primary roots may be the same. They also have less leaf area exposed for the transpiration of water.

Where there is much rain, varieties of grain sorghums with an open type of head should be grown rather than those with a compact type of head. There is a tendency for the compact type of seed head to mold even rot during wet periods in late summer or fall. When the head is open or spreading, air can circulate through the head and keep it dry.

For the past five years the South Carolina Experiment Station at Clemson, South Carolina has been conducting a variety test of some of the most promising grain sorghums. These varieties were planted at the same time and at the same rate. The

**Continued on page ten**



# The Agrarian Presents

## GEORGE HUBERT AULL, Ph. D.

*A Clemson Man Who Has Gone Beyond His Line Of Duty*

The main attraction when I entered the office of the head of the Clemson's Department of Agricultural Economics and Rural Sociology was Dr. George Hubert Aull's cheerful smile and hearty hand shake. He was completely unaware of the Agrarian's plan to present him, and he was modestly surprised when I told him.

Looking around the walls, I noticed a number of famed degrees, fraternal certificates, and other documents. The sun was pouring through the Venetian blinds, giving the whole office a sunny businesslike appearance.

The interview began, and the series of events, unfolded to me, exposed the life of a man whose time has been and is that of perpetual, interesting activity.

Born in Pomaria (Newberry County), South Carolina, Hubert Aull was reared on a farm. He played hard as catcher on the high school and home town baseball teams.

For his higher education, Hubert chose Clemson. At this early stage of his career, he clearly manifested his leadership and journalistic abilities, for he became editor of the Tiger, business manager of the Agricultural Journal, advertising manager of the Taps (Annual), Y. M. C. A. editor of The Chronicle, and a member of the Y. M. C. A. Cabinet. He found time to earn some money by washing glassware for the botany department, minding babies for the faculty, writing essays for prizes, and painting advertisement signs. He once earned a new suit of clothes by merely painting some placards for a suit salesman staying with Clemson's local haberdashery.

World War I interrupted, and before Hubert graduated he served as an acting supply sergeant in the army. The day he was to be discharged, he happened to be AWOL and by a peculiar combination of circumstances, he was not punished, but he was honorably discharged with an extra day's pay. He counts this as one of his most interesting experiences.

Hubert Aull returned to Clemson and graduated in 1919 with a B. S. degree in Agriculture with a major in Agricultural Chemistry.

In the fall of 1919, Hubert went to work on his first important job at the First District A & M School in Statesboro, Georgia. He started off in a big way as teacher of agriculture, supervisor of the school farm, and commandant of students. For a little diversion, he assisted the coach with the football team.

Unknown to Supervisor Aull bid for a prize hog while observing it in the sale ring at a Statesboro fair. It seems that the auctioneer's assistant would crawl around the ring to get bids. Well, Aull merely winked at this auctioneer as a form of greeting, and the greeting was mistaken as a bid. Aull winked



**Dr. G. H. Aull, head of the Clemson Department of Agricultural Economics and Rural Sociology.**

several times before discovering he had run the price up to \$350.00. Luckily someone else out bid him.

In 1920 Aull returned to his native state, South Carolina, to teach mathematics, agriculture, and science at the Marion High School. The girls basketball team here needed a coach—Teacher Aull took this job over, too, besides organizing and leading a troop of Boy Scouts.

Aull again found himself at the Clemson Agricultural College in the summer of 1921. This time he was to stay permanently. He started out with the Experiment Station as Assistant Director of Research. He studied during the summers, and in 1928 he received his M. S. degree from the University of Virginia. Then, in 1933, he was made head of the Department of Agricultural Economics in addition to his job as Assistant Director of Research. In 1936 he became Head of the Department of Agricultural Economics and Rural Sociology, and retains this position today. Through continued study, he received his Ph. D. degree from the University of Wisconsin in 1937.

Except to accept the Laura Spellman Foundation social science award for research and study at



the University of Wisconsin during the year 1929-30 and occasional temporary leaves of absence for study and service to the Federal Government, Dr. Aull has remained faithfully with Clemson. He once acted as Senior Administrative Officer, Land Policy Section, for the Agricultural Adjustment Administration. Since 1939 he has been Economic Consultant to the Nation Resources Planning Board. These services have contributed to the prestige of Clemson.

Dr. Aull is active in a large number of organizations. The professional associations of which he is a member are the American Farm Economic Association, American Economic Association, American Political Science Association, American Academy of Political and Social Sciences, National Tax Association, Southern Economic Association, and the Rural Sociological Society. His outside organizations include the Masons, of which he is past master and the American Legion, of which he once served as post adjutant. He is also a former scoutmaster of the local troop, Boy Scouts of America. He is now a member of the Advisory Board of the Y. M. C. A. and of the Interstate Committee of the "Y" for North and South Carolina. He is also president of the Anderson Rotary Club, director of South Carolinians, Incorporated, and a member of the Board of Trustees of Penn Normal Agricultural and Industrial School for Negroes on St. Helena Island, South Carolina. He belongs to the International Torch Club and is treasurer of the Clemson Baptist Church.

Of the Clemson College organizations, Dr. Aull is an honorary member of the Blue Key, Phi Kappa Phi, Gamma Alpha Mu, and faculty adviser for The Agrarian.

The subject of taxation is one in which Dr. Aull is most interested. He has done considerable research work on the subject, and perhaps his greatest contribution to society has been in taxation work. Governor Maybank, during his term of office, appointed Dr. Aull one of a committee of three to study and report on the fiscal system of South Carolina.

Dr. Aull is author of a number of tax studies including **Taxation and Ability to Pay, Some Inequalities in the Assessment of Farm Real Estate, and The Probable Economic Effects of a Homestead Exemption Act on Public Revenue in South Carolina.**

As a journalist, Dr. Aull has not limited himself to writing on taxation work alone but has written on land planning, agricultural programs, and farm philosophy. He is author of **A Brief History of The South Carolina Experiment Station, and Rural Land Holdings in South Carolina.** One time he wrote about South Carolina agriculture for inclusion in one of a set of agricultural encyclopedias. Incidentally, for writing this summary he received a set of these encyclopedias plus a substantial check.

Married in 1922, Dr. Aull has since become the father of one son and a daughter. His daughter, Anne, goes to the Clemson-Calhoun public schools and his son, George, is a junior at Clemson. Both are talented musicians.

Dr. Aull is keenly interested in his scrapbook in which he pastes poems, jokes, and pictures that interest him. He does not segregate his moods from one page to the other but perhaps has a conglomerate

tion of witty jokes, a bit of art, a droll sonnet, and a wistful prayer on a single page.

In his home Dr. Aull has a wood shop where he can practice his talent as an amateur cabinetmaker. He once collected stamps, but his daughter has since taken over this collection. Hiking, fishing and hunting are extremely pleasant past times to him. He purchased 25,000 acres of land for the Federal Government in 1935-36 which he thought perhaps might be used as a "hunter's paradise" for Clemson professors. Ironically, Clemson officials now in charge decided to let the wild life live, and the land is reserved as a game sanctuary.

The way the Clemson campus is sometimes littered with refuse is a pet peeve with Dr. Aull. If the cadets would cooperate, he believes a lot could be done toward keeping the campus in a neater looking state.

Those who know Dr. Aull admire him for his wise judgements and thoughtful advice. His ability to speak interestingly and intelligently to any group large or small is another admirable trait of his. As for his journalistic ability, there is sufficient evidence from the things he has written that he is quite capable as an author.

With his devoted and incessant earnestness in all of his tasks, he has accomplished much in bringing valuable service, prestige, and honor to the state and college. For his many brilliant achievements, we are indeed proud to have him a part of Clemson and the Clemson tradition.

—THE AGRARIAN—

## ATTAINING LEADERSHIP

There is hardly anyone who does not admire a well developed, healthy, physical being. One does not have to have the physique of Atlas, but he should at least be healthy and have a body which will respond favorably to physical work and play. Because admiration is one of the prerequisites to leadership, it is important that a prospective leader develop himself physically. Wholesome food, ample sleep, and systematic exercising will be helpful.

"All brawn and no brain" is a commonplace statement critically made about some men, and it is often true. In order to lead others, we must have a definite knowledge and the desire for new knowledge in our respective fields of leadership. A condition where one would try his leadership abilities without sufficient mental ability and training would be similar to the proverbial "blind leading the blind."

Our social contacts are extremely important in developing our leadership personalities. We gain new ideas and outlooks, thus enabling us to cope with problems in a satisfactory manner. In many of our social gatherings, we are often able to develop our speaking ability which is so essential in leadership. Associating with many types of people finds us better able to "get along with others."

God shows us the way, and without His help we would be unsuccessful leaders. There are those who do not adhere to the Christian ideals and who claim to be leaders, but they are respected by only a small minority. Christ, whose name has lived through the ages, is our best example of a most successful leader; therefore, we who live a life of Love and Truth will be benefited in our efforts of leadership.





# CLEMSON FELLOWSHIP CLUB CLINIC

*Clinic Contributes Valuable Service To Clemson*

**By J. L. Schaffer, '43**

It had been felt by the residents of the Clemson College campus that a clinic of some sort was needed. The lack of proximity of a town of any size to treat patients made the clinic an absolute necessity. The Clemson Fellowship Club, composed of 65 members which represent all activities of the college and community, took a deep interest in this project and on January 3, 1939 opened the clinic for the first time.

The clinic is used for three purposes. It gives care to babies and prenatal cases, it is used for venereal disease control, and for immunizations. A different day in the week is devoted to each of these.

The clinic is open to all who desire to make use of it, and there is no charge except for syphilis control which is only ten cents per shot.

The personnel of Oconee and Pickens County Health Department furnish professional service. The medicine and supplies are furnished by the S. C. Department of Public Health, and The Fellowship Club furnishes the clinic. It pays for the upkeep and incidental expenses which are incurred.

Dr. C. E. Ballard of Pickens is in charge of the professional work of the clinic, and he is assisted by Dr. E. J. Bryson of Liberty who does most of the professional work at Clemson. Mrs. W. H. Gray of Clemson is Nurse's Aid in active charge of the clinic. She gives her services without compensation.

All persons who handle food on the college campus are checked periodically, and those free from disease are given health cards.

In the treatment of syphilis, there are two kinds used—the heavy metals which are injected into the arm and the arsenical treatment which is injected into the hip. These treatments are alternated until a negative report is found. In the heavy metals treatment, bismuth is the drug used; it is injected directly into the tissue. In the arsenical treatment, arsenic is used; the drug is injected directly into the blood stream. I observed the doctor take extreme care to see that the drug is injected into the blood stream for if any of the arsenic goes into the tissues an acute soreness will develop in the region of the body. Treatment is absolutely voluntary on the part of the patient. In the three years it has been operating, the clinic has accomplished the following:

- 1390 persons received triple typhoid inoculations.
- 69 persons were vaccinated for small pox.
- 86 were given diphtheria inoculations.
- 417 given tuberculin tests.
- 40 given X-ray check for T. B. at Pickens.
- 49 Mid-wife clinics.
- 41 Pre-natal clinics.
- 38 Well Lady clinics.
- 633 Blood test (over 50% positive Wasserman)
- 179 Health Cards issued.
- 3,978 Syphilis treatments given.

The man who was the moving force behind all this work is Ben E. Goodale connected with the Dairy Department at Clemson College.

Anyone may visit the clinic whenever it is open which is on Tuesday and Friday afternoon, and the first Thursday of every month.

There are many communities in the state and the nation who, at a small expense, could start a clinic like this. The time and effort would be repaid many-fold by the better health it would bring.

—THE AGRARIAN—

## Grain Sorghums For South Carolina

**Continued from page seven**

fertilizer treatment was the same for all varieties. A summary of the yields of these varieties during the five-year period 1937-1941 follows:

Variety	Yield in Bushel Per Acre
Hegari	47.5
Schrock (Sagrain)	43.5
Blackhull Kafir	43.3
Pink Kafir	39.0

The fertility level of the soils where these experiments were carried on is above the average South Carolina soil, and results as high as these could not always be expected.

Grain sorghums should be planted about ten days after the ordinary planting date for corn. Six to ten pounds of seed per acre should be planted in rows from three to four feet wide. About 300 pounds of a complete fertilizer per acre should be applied at time of planting. The crop ought to be given shallow cultivation during the summer.

The feeding value of grain sorghum averages about 90 per cent of that of corn. When properly supplemented with feeds rich in protein, calcium, and vitamins A and D, the grain sorghums are excellent for all classes of stock. The grain sorghums are sometimes slightly less palatable than corn. Better results are obtained if grain sorghums are ground before being fed to all stock except sheep.

Certainly grain sorghums should be given a trial by farmers who farm dry up-land soil and who need more feed for their livestock herds.

—THE AGRARIAN—

The "four freedoms" of the great democracy of 4-H Clubdom are the freedoms of head, hand, heart and health.

—THE AGRARIAN—

Make the market want your quality of product more than it wants the other producers and you have no competition.

—THE AGRARIAN—

Gentle suggestion to hog producers: Don't share the meat with swine diseases and pests.

# NEWBERRY TURKEY FARM

## A Clemson Man Became Successful By Growing Turkeys

By H. L. Parr, '43

One of the South's largest turkey breeding farms is located in Newberry County where the owner, Waldo Huffman, hatched and sold over one hundred thousand poult last season. The breeding flock consists of around 5,500 hens and toms of the broadbreasted bronze strain.

Mr. Huffman attended Clemson where he majored in dairying. Upon graduation, he engaged in dairying and poultry raising on a small scale, but later he became supervisor of the Poultry Department at Thornwell Orphanage. While there he had his first experiences in raising turkeys. As the business grew and it became necessary to enlarge, Mr. Huffman decided to come to Newberry and go in the turkey business for himself on a large scale.

He began in a small way with one incubator and a flock of a thousand birds on a farm that had room for expansion. In three years time his business increased until last year he was able to sell one hundred thousand poult.

The broadbreasted bronze strain of turkey originated in the Northwest in the states of Washington and Oregon, and Mr. Huffman was the first to introduce them in the South. This breed of turkey has several advantages over most of the other breeds, namely: they have bigger breasts with forty per cent more meat, shorter legs and blockier bodies; they mature faster and bring a higher market price. Mr. Huffman brings in new blood each year in hatching eggs, thus keeping his breeding up and reducing the possibility of spreading disease.

Mr. Huffman begins his hatchery about February first and ends about June 15. The breeding flock is put in two large sheds where they are prepared for the laying season. During the early part of the laying season lights are turned on about 4 o'clock in the morning to lengthen the day, thus bringing the turkeys into early production. By starting the hens laying, the poult have a longer time to grow and get a start before hot weather comes, thus getting a bigger turkey.

Mr. Huffman finds that hens start laying sooner and lay more eggs than older hens. This being the case, he sells all of his old turkeys when the laying season expires and raise a young breeding flock for the coming year. By doing this, he saves a lot of feed and labor and also has a chance to clean up his breeding pens and isolate them before the next laying season.

The eggs are gathered in wire baskets which allows the air to circulate through them and then



Bronze strain of turkeys.

COURTESY S. C. EXTENSION SERVICE

they are immediately stored in a cool cellar where they are graded and put in crates until placed in the incubators. The eggs are set so that there are two hatchings per week during the regular hatching season. Twenty-one hundred eggs are set for each setting. The poult have been sold even before the eggs are laid.

The poult Mr. Huffman keeps for himself for breeding purposes are placed in a brooder house 16 by 200 feet which has a capacity of about 3,500 poult at a time. The house contains 14 rooms, each equipped with an electric brooder, running water, wire floors, and a sun porch. They are kept in these houses for ten weeks before their feet are allowed to come in contact with the ground. Before being put out on the range, they are vaccinated for pox. The grazing on the range consists for the most part of corn and soybeans. The young turkeys are protected by range shelters until they become accustomed to remaining outside, which usually requires around ten days. Young turkeys are very susceptible to disease, so Mr. Huffman takes every precaution to keep the turkeys from being subjected to contagious diseases. The chicken is a very harmful disease carrier to turkeys, therefore, Mr. Huffman doesn't have a chicken on his farm. The feeders and water containers are built on runners which allow them to be moved to fresh ground fairly easily.

While the birds are on the range, they are carefully watched day and night. They are changed from field to field very often to prevent disease from coming in, and Mr. Huffman says that they have a very low mortality rate. They are never put back on the same field under a year's time.

The Huffman farm consists of a nice 135 acre farm, a hundred acres of which is in cultivation and

Continued on page sixteen





# BETWEEN THE

## JANUARY FARM HINTS

1. Be sure your cotton planting seed for 1943 was bred to produce staple at least one inch in length or longer. 2. Test seed for germination and plant only seed that test at least 80 percent. 3. If sufficient oats was not planted during fall to meet farm needs, plant this month, weather permitting. 4. Clean up hedge rows and wood patches between fields. 5. Spread limestone if not already done. 6. Plan for more food crops, not only for farm needs, but for a surplus to sell.

—THE AGRARIAN—

## HORTICULTURAL ADVICE

1. Prepare hotbeds, and coldframes to be able to have abundance of sweet potato, cabbage, tomato, pepper, and other plants for your victory garden. 2. Plant English peas (in lower part of state) if soil is in condition. 3. Prepare land for Irish potatoes, and order certified seed. 4. Prune fruit trees and vines preparatory to spraying with oil emulsion-Bordeaux or lime-sulfur. 5. Plant fruit trees at once, if soil is in condition. 6. Terrace all new orchards before planting.

—THE AGRARIAN—

## INSECTS AND DISEASES

1. Plan to treat cotton seed before planting.
2. Continue cleaning orchards to destroy fallen fruit and limbs to control disease.
3. Rotenone will control warbles in backs of cattle.
4. Do not burn woods to control insects.
5. Apply dormant spray to peach trees for San Jose scale and leaf curl.
6. Examine cattle for lice, and ask the county agent about the new dust for lice.
7. Order certified Irish potato seed.

—THE AGRARIAN—

## NEW YEAR RESOLUTIONS

I will get permanent "farm relief" from building better soils.

I will market more of my farm products in the form of livestock.

I will manage my farm work by old Ben Franklin's shrewd advice: "Drive thy business; let not thy business drive thee."

I will not gamble with yields by using poor seeds and following unintelligent fertilizing practices.

I will cooperate with others wherever possible, in community progress, marketing of products or what not.

I will, despite failures and calamities that may come, "—trust God, see all, nor be afraid."

## ANIMAL HUSBANDRY

1. Balance corn for hogs with fish meal, skim-milk, or tannage.
2. Allow beef cattle ample cheap roughage.
3. For fall calves turn bull with cows about January 15.
4. Give idle mules free access to roughage, but cut the grain to a half ration.
5. See that all classes of livestock have shelter, with extra bedding for cold nights.
6. Make use of barley, rye and oats for hog and cattle grazing.
7. Repair the pasture fences.

—THE AGRARIAN—

## DAIRYING

1. Make inventory of livestock, feed, and equipment.
2. Decide now whether you will have silage next fall and plan for its production.
3. Analyze herd records and decide where you can improve in management and feeding.
4. Repair pasture fences, clean out undergrowth, and stop washes in pastures.
5. Plan now for improving permanent pastures and for summer crops to supplement permanent pastures.
6. Start the new year right by keeping daily milk and feed records on each cow. Make January a planning month for the coming year.

—THE AGRARIAN—

## POULTRY

1. Mate breeders for hatching eggs.
2. Make special breeding pen for best hens and pedigreed male to produce cockerels for next year's matings.
3. Provide breeders with green range.
4. Get ready for baby chicks.
5. Move brooder houses to new ground before starting chicks.

—THE AGRARIAN—

## AGRICULTURAL ENGINEERING

1. Check over farm machinery for needed repairs and order repair parts now.
2. Arrange sheds and farm shop for better care of machinery and equipment.
3. To insure efficient operation of farm machinery, follow instruction manual recommendations of lubrication, adjustment, etc.
4. Make needed repairs and improvements on buildings, fences and gates.



# FURROWS

## COOPER AND COLLINGS HONORED

Dr. H. P. Cooper and Dr. Gilbert H. Collings have been selected to be in the first edition of "Biographical Encyclopedia of the World." It includes the outstanding individuals in all countries, and corresponds to the American publication "Who's Who in America" and the British publication "Who's Who." Two members of the Clemson faculty will be listed in the next edition of the "Biographical Encyclopedia." These members of the faculty are Dean H. P. Cooper of the school of Agriculture department and Dr. Gilbert H. Collings of the Agronomy department. Dr. Cooper is also listed in "Who's Who in America" along with eight other members of the Clemson faculty, and Dr. Collings is also listed in "Who's Who in America" and in "Who's Who in the Western Hemisphere."

—THE AGRARIAN—

## SOUTHERN AGRICULTURAL WORKERS MEET FEBRUARY 3-5

Clemson Extension Service, Experiment Station, and school of Agriculture workers will be well represented as usual at the forthcoming annual conference of the Association of Southern Agricultural Workers, which will be held in New Orleans, February 3, 4, 5, 1943.

Announcement of the date of the conferences has just been made by F. E. Miller, North Carolina Department of Agriculture, Raleigh, North Carolina, secretary-treasurer of the association. The officials and executive committee of the ASAW and agricultural leaders generally feel that, in view of the complex problems of farm production now facing southern farmers, the 1943 convention of the association should be a most important one.

—THE AGRARIAN—

## ALPHA TAU SENIORS HOLD COACHING CLASSES FOR FRESHMEN

Senior members of Alpha Tau Alpha, National Professional Agricultural Educational Fraternity, are holding regular coaching classes for freshmen who are behind in courses such as English, chemistry, zoology, and mathematics. The classes are held three nights a week and are well-tended. The following members are helping with the classes: Ralph Hoffman, Georgetown; C. B. Lowman, Lexington; W. S. Jackson, Manning; L. R. Cox, Moncks Corner; L. E. Pence, Tatum; and R. M. Richbourg, Camden. Other members include: C. H. Brown, Travelers Rest; W. A. Collins, Mullins; N. J. Thomas, Knoxville, Tennessee; C. S. Hughey, Greer; W. F. Minton, Lewiston, N. C.; R. E. Linder, Chapin; J. E. Herlong, Saluda; and C. B. Pence, Tatum.

## DRIED EDIBLE BEANS VICTORY FOOD SPECIAL

Dried edible beans will be the National Victory Food Specials during the week of January 18-23, according to notice received here by the Clemson Extension Service from Southern Regional Administrator James H. Palmer of the Agricultural Marketing Administration.

Retail grocers, wholesalers, producer organizations, and other food trade groups in the South are being asked to make sure that sufficient supplies of dried beans are at hand locally; and all are joining in an effort to direct consumer attention to this cheap, abundant source of proteins.

Pointing out that military and Lend-Lease needs will take one-fourth of our food production in 1943, Mr. Palmer suggests that Americans at home will be patriotic to eat more beans and other foods that are plentiful so that our doughboys can really be "the best fed soldiers in the world."

—THE AGRARIAN—

## LIGHTS FOR MORE EGGS TO MEET WAR DEMANDS

Lights are one of the best means of stimulating winter egg production. Farmers are urged to increase egg production to help in the all-out war effort.

Trials have shown that the presence of light causes increased functioning of the egg-producing organs, and while the use of lights will not increase the yearly egg production of hens, they will cause hens to lay a greater number of eggs during the fall and winter months when the price of eggs is highest.

It is not necessary to use bright lights, and it has been found that a 15-watt bulb to each 20-foot section of the house will give ample light. This size light does not have to be shaded. Kerosene lanterns can be used successfully for lights.

Contrary to popular belief, lights do not lower the hatchability of eggs or the strength of chicks, repeated trials having shown that neither morning nor all-night lights have any such effects.

—THE AGRARIAN—

## AG. ENGINEER KILLED IN ACTION

J. E. Cottingham, Jr. was killed in New Guinea last November. He finished Clemson in April, receiving his B. S. in Agricultural Engineering. While at Clemson, J. E. Cottingham, Jr. was a member of A. S. A. E., Alpha Zeta (Junior and Senior years) and the Y. M. C. A. Council (Freshman, Sophomore Junior and Senior years).

Clemson men will not forget J. E. Cottingham, Jr., and we will see to it that he will not have died in vain.



# Peanuts For Victory

*Peanuts Are Pinch-Hitting For Various War Commodities*

By W. H. Eaddy, '44



Peanuts should be left in stacks from four to six weeks to become well cured.

COURTESY S. C. EXPERIMENT STATION

The present condition that our country exists in has created a shortage of oils and fats. These important materials are essential for production of supplies needed by our armed forces. The farmers are asked to increase their production of peanuts in 1943. The government guaranteed the farmers a price of \$82.00 per ton for oil purposes in 1942 and will probably do the same this year.

In 1941 the peanut acreage amounted to 1,914,000 in the South with a production of 1,476,845,000 pounds. An acreage increase of 5,000,000 was accomplished in 1942 with a production of 2,921,950,000 pounds. The 1942 crop is expected to reach the \$1000,000,000 mark in value.

A certain amount of these peanuts were grown for the manufacture of peanut oil. After the edible trade gets its normal supply, the 1942 peanut crop will furnish three or four times that quantity to be crushed for oil.

Peanuts are used in making peanut candy, salted peanuts, shortening fats, and nitroglycerine products. Nitroglycerine is a product used to a great extent in high explosives. Approximately six tons of peanuts are used every time a battleship fires one of its 16-inch guns.

The importance of the peanut industry in war-time has not yet been fully realized by the American people. They must be told how peanut oil serves its purpose in the manufacture of explosives so essential in our war effort and how edible oil and peanut butter are in demand for food for our armed forces as well as for civilians. The government has recommended peanuts as an important food product for our men under arms.

A much larger acreage will be necessary in 1943 than ever before to make up for shortages in our vegetable oil supply. About three and one-half million acres of the 1943 peanut crop will be crushed for oil with a half million ton of meal as a by product. Farm animals relish good peanut meal and it is an excellent protein feed for them. This protein is probably nearer perfect for animal nutrition than any other important source of plant protein. For economical gains, hog feeders should reduce the corn and increase peanut meal up to three-fourths of the total feed. Animals receiving large proportions of peanut meal should have plenty of water and a good mineral mixture such as one made up of equal weights of charcoal, bone meal, ground limestone and salt.

Peanuts are usually very hard on land due to removal of practically all the organic material, especially when peanuts are harvested instead of being hogged off. Best results are obtained of peanuts when rotated with other crops or rest the land two years out of three. To increase production farmers are urged to plant winter legumes. Oats make a good winter cover crop and should be planted early and well fertilized because peanuts receive little fertilizer and the succeeding crops require heavy fertilization.

A well-drained sandy loam is the type of soil that produces the best peanuts for commercial use. Dark colored soils will produce large yields but seem to discolor the hulls. Most of the peanuts grown for commercial use are confined to the coastal plain section.

Higher yields are assured if peanuts are grown on soil where a loose surface can be maintained. Heavy soils are improved by the practice of turning under green manure crops or by adding ground limestone. Peanut soil requires a large amount of organic matter. Legume crops grown in rotation are excellent for this purpose. Very unsatisfactory yields are likely to occur if peanuts are grown on poorly drained soils.

Peanuts are adaptable to a wide range of climate. It requires a growing season of about four months without frost, moderate rainfall, and a relatively high temperature.

Many varieties are available for growers to

choose from. White Spanish and Improved Spanish constitute the major part of the crop grown for the markets in South Carolina. The Improved Spanish has larger pods and are more vigorous plants. The Spanish variety is easy to cultivate and produce higher yields in South Carolina soils. If peanuts are grown for commercial use most markets prefer the small white Spanish because it contains a higher oil content.

By the use of fertilizer on soil low in organic matter, peanut yields are increased. Fertilizer has little effect on nuts if the soil is naturally fertile. A complete fertilizer is used profitably if the soil is a poor sandy type. The South Carolina Experiment Station recommends a 2-12-6 fertilizer for peanuts. An application of about 400 to 500 pounds per acre is used successfully by large peanut growers. To insure a good stand, peanut seed should be of high vitality. Usually seed is treated with Coresan. Care should be taken when peanuts are shelled for seed. If the skin of the kernel is broken, it will seriously effect germination.

High yields of Spanish peanuts are produced in rows 24 to 30 inches apart. Six inches in drill is commonly used. Other varieties such as the Runner and Bunch varieties require wider rows and more spacing.

The best peanut planting time is about the middle of the cotton planting season. After the rows are laid off, the fertilizer is then distributed. The planter follows along the same mark. Seed should not be covered over  $1\frac{1}{2}$  to 2 inches.

Frequent shallow cultivations are necessary to reduce the amount of weeds. Peanuts are usually hoed once or twice. The use of light harrow is recommended when the plants are small. An implement to work the soil toward the plant is generally used during the latter period of cultivation. To prevent difficulty in harvesting, effort should be made to lay by clean.

Particular attention should be paid in harvesting peanuts. Harvesting too early or too late greatly decreases the yields. Yellowing of the leaves usually indicates maturity.

After the plants are plowed up, generally with a turn plow, it is necessary to shake the dirt off the plant and allow it to wilt before stacking around poles for curing. The top of the stack should be capped with grass or straw. Peanuts should be left in stacks from four to six weeks to become well cured.

A mechanical picker is essential when peanuts are planted on a commercial scale. When nuts are planted in small lots they may be picked by hand. Storage facilities should be provided if a farmer is going to raise peanuts as a cash crop. Peanuts should always be sold by actual weight rather than by the bushel. There is a difference between the weight of Spanish peanuts and Virginia peanuts. The former yields more oil and is urged by the government to be planted for this purpose.

## Clemson's Redevelopment Project

The Submarginal Land Surrounding Clemson College, That Was Taken Over By The Government Is Known As The "Cherry Farm"

By W. B. Camp, Jr., '44

The Cherry Farm is a part of the 20,000 acres of land surrounding the Clemson Agricultural College that was taken over in the recent government project and turned over to Clemson for redevelopment. Most of the 20,000 acres was found too steep to farm and was replanted to forest. However, the Cherry Farm, which is between 500 and 600 acres in size, is being worked as a demonstration to see if the farmable part of the project can be put on a paying basis.

The Cherry Farm is one of the old places in this part of the country. The Cherry family started it and in the beginning was a very fine farm, but because they did not have control of the surrounding area the drainage was very poor and the farm deteriorated rapidly. Now because the surrounding land is controlled by Clemson College, it is hoped that the land can be built back up and put on a paying basis.

Dr. H. P. Cooper, Dean of the School of Agriculture of the Clemson Agricultural College, is in charge of this experiment. The object is to see if this land can be used for the profitable raising of cash crops, hay, and forage, also, finding out how to grow these crops on this land.

Some critics claim that the Cherry Farm is not sub-marginal land and therefore is not suitable for such a demonstration, but the way the land was previously handled was definite sub-marginal.

The farm is being terraced where necessary, and kudzu is being planted behind the terraces. Trashy farming is also being tried to see if it cuts down erosion.

On the farm is a complete shop and machinery shed containing trucks, tractors, road equipment, and wagons, also a small sawmill left by the government when it was turned over to Clemson College. There are two combines on the place, one for terrace land and one for bottom land.

When Dr. Cooper began work on this farm he had in mind power farming but since the outbreak of the war he has been raising mules in order to conserve machinery. There are a total of twenty Belgian mares on the farm, and from these he is raising mules. There are also a number of cows that were purchased from a Savannah dairy that are being crossed with purebred bulls and some very fine calves are being raised.

There are about 200 acres of open land in the river bottom, half of which is planted to corn the other half being in oats and hay. The corn is being hogged off and will be rotated with small grains and hay. A large amount of the hay is being baled and stored away for future use.

Some of the land can now pay its own way after being terraced, limed, and phosphated.





# Sweet Potato Feeding for Dairy Cattle

*A Discussion Of Dehydrated Sweet Potatoes As A Possible Feed For Dairy Cattle*

By Jerry H. Rosenzweig, '43

The commercial introduction of the dehydrated sweet potato as part of the dairy ration is a relatively recent development, not withstanding more than two decades. Much emphasis has been placed on the sweet potato in the Southeast primarily for its nutritive value as a feed as well as a food. Furthermore, the growth of this root is fast supplanting other crops. As a feed, the dried sweet potato ranks with the best of Iowa's corn in feeding value, producing more energy in yield per acre than either corn, barley, or oats. In addition to the energy value of the sweet potato, there is a large carotene concentration, which is low in corn and other concentrates.

Sweet potatoes offer a variety of forms for livestock use. The vines make good grazing and good silage, the roots may be fed green or converted into silage, the potatoes may be dried from a succulent product into a concentrated feed. Comparative results between sweet potatoes and silage fed to Jerseys and Holsteins indicate that a 10 per cent increase of milk was obtained from the sweet potato over that of the silage, which was fed at twice the rate. In addition, 240 pounds of silage were required to equal 100 pounds of sweet potatoes.

More recently the dehydration of sweet potatoes to form a product which is not subject to spoilage, which can be ground to flour, and which can be shipped to distant places has been sought. Although the dehydration process merely consists of the removal of water, the equipment necessary to furnish this process was estimated at \$25,000—or too much money to be able to render the farmer any benefit. The Alabama Agricultural Experiment Stations at Auburn, found a simple method of dehydrating the sweet potato. Their process consisted of placing sliced potatoes on an oil or asphalt surface in the sunlight from one to two days. This method was readily adopted by other state colleges and institutions and was made available to farmers for its application at very little cost. Dehydration by this method left the product completely dry and extinct from perishability.

Dehydrated sweet potatoes are now being utilized extensively as a substitute for corn and other concentrates for the purpose of supplying a greater amount of energy as well as carotene. This was formerly supplied in cod liver oil, which is now too expensive and difficult to obtain because of the war. The average amount of carotene in the dried sweet potato is 130 micrograms per gram or 217 International Units of Vitamin A, which far supercedes the amount contained in white corn.

In order to show the exact affects of the feeds on the carotene content of the milk, an experiment was held at Clemson dairy barn comparing the nutritive values of the dried sweet potato with that of white corn. In this particular experiment, two Guernsey cows were placed on a vitamin low ration which consisted of: (a) 50 per cent Cotton Seed Meal, (b) 25

per cent Wheat Bran, (c) 25 per cent White Corn, (d) Beet pulp (roughage). After seven weeks on the above mentioned ration, the milk showed very little carotene or vitamin A. The white corn was then replaced by sweet potato meal, and the milk gradually increased in vitamin A content until the feeding of the sweet potato meal was discontinued. Similar experiments conducted at the dairy barn show the beneficial affect of the dehydrated sweet potato upon the dairy calf. In one experiment it was the only source of vitamin A and was administered in skim milk; in this case the calf grew well and stored vitamin A in its liver. Throughout all experiments conducted here or elsewhere the conclusions resulted in the finding of the dehydrated sweet potato as a palatable and nutritious feed which can be substituted for any concentrate depending upon the availability of the grain, and the type of soil best suited for the crop. Corn may be best applicable where the sweet potato isn't and vice versa.

Although all preceding data highly recommend the sweet potato as a good nutritional feed, economically it would tend to cost more than the ordinary concentrate feed. Generally, the cull potatoes are used as feed for livestock; whereas, the marketable sweet potatoes are sold for human consumption, since they command a higher price per bushel.

—THE AGRARIAN—

## NEWBERRY TURKEY FARM

Continued from page eleven.

is planted in grain. He also plants a mixture of oats, barley, and crimson clover for winter grazing. His summer crop consists of corn and soybeans. The birds eat the beans while the corn furnishes shade. The entire farm is operated with a John Deere tractor and there is only one mule on the farm. Mr. Huffman is a good farmer as is shown by the 4,000 bushels of grain that he produced last year.

Mr. Huffman says that he could have sold twice as many poults as he did last year. There seems to be a bright future in store for turkey farmers and there is a real opportunity for a lot of one-crop cotton farmers to find a new source of income.

### THE ANIMAL HUSBANDRY DEPARTMENT of CLEMSON COLLEGE

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Berkshire Swine

Polled Hereford Cattle

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# Ag--House Personalities

Dr. George M. Armstrong - - - Prof. Franklin S. Sherman

By J. H. Cannon, '44



**Dr. George M. Armstrong,**  
head of Clemson Botany and  
Bacteriology Department.

"Doc," as he is known to all the Clemson students, was born on the outskirts of Appleton, South Carolina in 1893. One of his earliest ambitions, to be a railroad engineer, was realized at the ripe old age of eight when he was allowed to ride in the cab of a train from Appleton to Augusta, Georgia.

His first association with a public education system was in Appleton, but when he was nine years old his family moved to barnwell. Soon after, scholarships were being offered at Clemson College on the basis of competitive examinations. "Doc" took one of these exams while in the tenth grade and passed with the highest grade in a group of sixteen boys who had already completed high school. He entered Clemson without having finished high school, and at the time, he was only sixteen years old and weighed 110 pounds. After graduating from Clemson Dr. Armstrong did graduate work at the University of Wisconsin where he received his M. A. degree, and later he received his Ph. D. from Washington University in St. Louis, Missouri.

In June 1924 he became connected with the Division of Boll Weevil Control at Florence, South Carolina. He remained there doing research work on cotton until 1928 when he returned to Clemson to take up his present work of teaching and working on the life histories and control measures for plant diseases. He is now head of the Botany Department and State Plant Pathologist for the South Carolina Crop Pest Commission.

One of Dr. Armstrong's favorite hobbies is gardening which provides both recreation for him and delicacies for the table. He also devotes much of his spare time to the members of the campus Boy Scout Troop. When the call for scrap paper was sent out by Uncle Sam, "Doc" went all out for defense and did his share by riding the back of a truck and loading paper on it. The local salvage committee, of which he is chairman, has collected many tons of paper and metal.

Mrs. Armstrong is a native of Seattle, Washington, and the joke is told that "Doc" had to go all

Continued on page twenty

If you ever hear the familiar name, "Pop," echoing through the halls of the Agricultural Building then you know that someone is speaking of Mr. Sherman. This likeable old man who is known for his ability to outwalk his classes on field trips was born in Fairfax County, Virginia and completed his grade and high school education there.

He attended Cornell University where he received his B. S. degree. He was one of the few persons ever having entered the school of entomology with his collection already made. The University of Maryland presented him with an honorary M. S. degree.

In 1900 he became associated with the Entomology Department of the North Carolina State Department of Agriculture. He remained there until 1905 when he went to Ontario Agricultural College. Here he was professor of zoology and entomology for a year and he says that this experience in a Canadian college has been invaluable to him. He returned to North Carolina in 1906 and remained until 1925 when he came to Clemson College to take up his present duties.

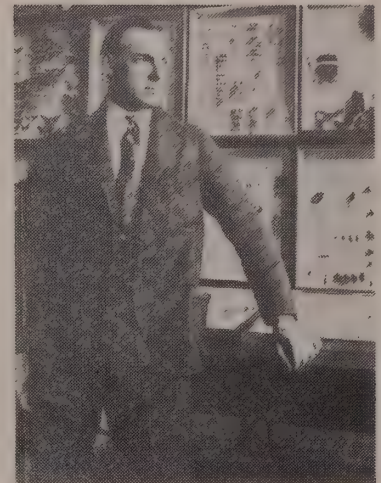
"Pop" is now head of the Zoology and Entomology Department and State Entomologist for the South Carolina Crop Pest Commission. He teaches one class which is taken by all the juniors in the School of Agriculture, but to those students majoring in entomology he teaches other classes in which they come to know him much better.

During the last world conflict he campaigned in North Carolina for the sale of war bonds. Though he hasn't done any active campaigning in this war, Mr. Sherman takes pride in buying his share of war bonds each month.

Mr. and Mrs. Sherman have three sons who have graduated from Clemson College. The oldest, Franklin, Jr., is the only one to major in entomology. He is now in the Sanitary Corps of the U. S. Army, and one of the other boys is a major in the army Air Corps in Africa. His only daughter was recently married to a 1942 Clemson graduate who is also in the army.

"Pop's" favorite forms of recreation are trout

Continued on page twenty







# Electricity For Sweet Potato Curing And Storing

*"Factors To Be Considered In The Design Of An Electric Heated Sweet Potato Curing House"*

By J. K. Windell, '43

EDITOR'S NOTE: The following article is based on studies by Dr. J. B. Edwards and Prof. C. H. Dankelburg, of the South Carolina Experiment Station.

The sweet potato is the most important vegetable crop in the south. The fleshy root is a living organism and environmental conditions in the storage house must be favorable for a long storage life. We must know how it responds to certain conditions in order to effectively design sweet potato storage houses. Some of these responses have been studied by various plant physiologists, pathologists and horticulturists, and the results are most valuable.

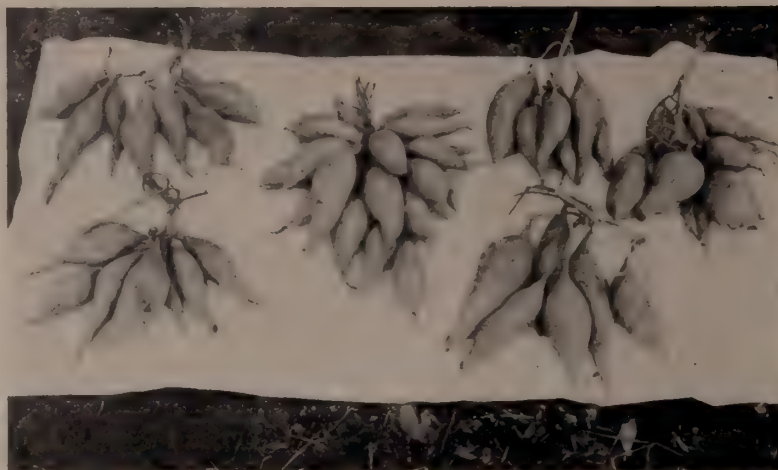
About four or five weeks after the plants have been set in the field, some of the roots at the base of the plant thicken and become fleshy. The sugars, which are manufactured by the leaves, are transported to the roots and changed to starch. In mature roots approximately 80 per cent of the carbohydrate content consists of the starch and the remainder consists of various sugars. The young roots are slender and the skin consists of a layer of living cells. This skin can withstand very little stress or strain caused by the rapidly growing potato or by mechanical injury. As the root develops, this layer is replaced by a more permanent and elastic set of tissues which retains the water and keeps out rot-producing organisms.

At harvest time this new skin is easily injured or bruised. If the potatoes are handled with gloves many bruises and injuries will be prevented. The wounds must be healed quickly if the potato is to enjoy a long storage life. If this is not done quickly, water necessary for life processes escapes and the potato shrinks badly. Under favorable conditions the potatoes lose approximately 5 to 6 per cent of their weight during the storage period. The skin of the cured potatoes will have a "velvety" feel.

While the wounds are being healed and the skin is being thickened, certain changes are taking place within the potato. Most important is the speeding up of the rate of respiration, a process which uses the sugars of the roots as a source of energy. The loss in weight is due to carbon dioxide and water.

After potatoes are cured, they must be stored until they are sold or used. At the proper storage temperature, 50 to 55° F, the respiration rate is comparatively low. Some shrinkage may occur due to evaporation of water through the skin. This evaporation can be retarded by maintaining a high humidity within the storage house, but it must not be high enough to cause condensation. A relative humidity of 80-85 per cent does not permit condensation.

Electricity, as a source of heat, is now being used in sweet potato storage houses in an attempt



An example of Sweet Potatoes well cured with electrical equipment.

COURTESY S. C. EXTENSION SERVICE

to provide more uniform environmental conditions. According to the South Carolina Experiment Station any new use of electricity on the farm should meet the following requirements:

1. Do a better job.
2. Perform a task cheaper.
3. Do a job previously impractical.
4. Make the farm more self sustaining.

Electricity, as a source of heat, in sweet potato curing houses, has been shown to meet the above requirements when properly installed and operated.

In order to do a better job of curing and storing the roots, the house must be sanitary and capable of being cleaned to eliminate rot organisms. The buildings must be well insulated with positive ventilation controls to maintain optimum temperatures. It is necessary to have a well distributed heat supply and an elimination of hot and cold spots, and a method of preventing wide fluctuations of temperature at the heat source. Thermostatically controlled heaters will take care of temperature, and the moisture supply can be controlled by applications of water to a dirt floor.

Wood and coal will produce from five to ten times as many units of heat for the same energy cost as will electricity. On the other hand, wood and coal heating plants requires considerable attendance, while no appreciable amount is required by electric heaters, especially when regulated by a thermostat. Due to this difference in basic heat cost, particular attention must be paid to the construction of the building and to the operation of the system so that heat losses may be lowered.

Walls and ceilings are usually made of several thicknesses of wood sheathing and are made tight by building paper. Lumber prices have risen about 20 per cent, particularly southern pine common, which has been used extensively in defense work throughout the nation. The elimination of windows will

Continued on next page



# THE FAUNAL SURVEY

*A Record Of South Carolina's Wild Life*

By J. H. Cannon, '44

One of the most startling facts found in the records of the Faunal Survey is that there are only 92 known species and subspecies of mammals, commonly termed animals, in the state of South Carolina.

Fauna refers to the wild animal life of a locality or region, and by survey is meant the study of all the kinds of animals in an area, their distribution, habits, and seasonal history.

The Zoology and Entomology Department at Clemson has been compiling the information contained in the files of the Faunal Survey for 17 years. No work of this sort is ever complete because there will always be rare species of animals on which the data is incomplete and some undiscovered species on which there is no data whatsoever. By the time the records appear to be complete, some species of animals will have changed their habits. Others will have increased and spread into new localities, and some may have decreased in number enough to be near extinction. Every change in the accuracy of the information involved makes more difficult the task of collecting and compiling the data.

The Faunal Survey data is filed away under the proper heading on 5x8 cards. Each species of animal has a separate card on the front of which is recorded the localities and dates when observed or collected, name of collector, brief notes on behavior, abundance, mating habits, food habits, etc., all in condensed form. The reverse side of the card shows an outline map of South Carolina upon which is marked the localities where the species has been found.

Bsides the mammals, included in the animal

kingdom are birds, fishes, reptiles, amphibians, insects, and others. In all there are about 600,000 different kinds of animals named and described in all the world. A review of the information which has been compiled for South Carolina shows that there are 47 species and subspecies of snakes found in the state. Only a few of these are venomous and dangerous to human life. A subspecies is a form that varies somewhat from the typical specimens though not enough to be recognized as a separate group. The amphibians, that group which includes the salamanders or "spring lizards," the frogs, and the toads, have nearly 65 species and subspecies.

The fishes, though the data is hard to collect and is by no means complete, are estimated at approximately 400 different species. It is interesting to note that the number of fishes and birds is nearly the same. The data on the birds is nearer complete, and the estimation of their numbers is only slightly less; probably there are 350 to 375 species and subspecies.

The records show that the army of the insects is much larger than that of any other group of multicellular animals. At present there are 6,195 kinds of insects on record, which is slightly over one-half of the 12,000 that our state is estimated to have within its borders.

The Faunal Survey is a valuable, yet inexpensive asset to our state records. Through it accurate information is accumulated about South Carolina's wildlife. Though no one will ever know all the answers, this record enables the staff of the Zoology and Entomology Department to accurately answer many of the questions asked them about our wildlife.

## ELECTRICITY FOR SWEET POTATO CURING AND STORING

Continued from page eighteen

lower the heat loss considerably as well as lower the cost of construction and upkeep. Electric lights can be added which will give better light at less cost.

A filled dirt floor can be built cheaper than a wooden floor and will allow humidity to be maintained much easier. Wetting down the floor about one week before curing begins and once or twice during storage will supply sufficient moisture in the house to maintain the optimum uniform relative humidity for the entire period. The loss or gain of heat through the dirt floor will be small and have little effect.

Ducts for supplying air into the building should be near the floor and directly under the heaters in order to heat the air as it enters. All doors and outside ventilators should be weatherstripped.



Sweet Potatoes may be kept in good condition by proper packing and storing.  
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# THE POULTRYMAN'S JOB WITH THE NATION AT WAR

By L. O. Drew, '44

**EDITOR'S NOTE:** The following is a condensation of the talk given October 7, 1942 by professor C. L. Morgan, head of the Poultry Department of Clemson College, on the radio program, "Science in Agriculture," presented over station WAIM in Anderson, S. C. These programs, a weekly feature of the School of Agriculture and the South Carolina Experiment Station, are conducted by Mr. R. A. McGinty, Vice Director of the Experiment Station. This article was prepared by L. O. Drew, of the class of 1944.

As a possible answer to the problem of where a supply of meat can be found that will help relieve the current meat shortage, poultrymen in the United States are trying to increase meat and egg production approximately 15 per cent. Secretary Wickard has asked that 200,000,000 fryers be produced this fall and winter to meet the shortage of other meats. The Agricultural census reports give the number of chickens raised in the United States for 1939 as 660,000,000 birds. To produce 200,000,000 additional fryers means that the annual production will have to be raised approximately one-third.

There seem to be no serious problems involved in complying with Secretary Wickard's request, provided there is sufficient labor on the farms. The same houses and brooding equipment used last spring can be employed this winter. These houses and equipment are often idle on farms at this season of the year.

The objection has been made that the fall and winter months are the off-season for the production of baby chicks. This statement is quite true, and the higher price of eggs during the fall and winter will materially increase the cost of the chicks; but it can be done.

Some additional fuel for brooding will be required during the winter, especially if the houses are not well constructed or insulated. On the other hand, chickens make more rapid growth under cooler conditions, and parasites and disease organisms are not as prevalent during the winter months as at other seasons.

To increase our production of fryers by 200,000,000 chickens to three pounds weight over a million tons of feed is necessary. To make the figures more easily understood, it may be stated that for each 100 chickens raised to three pounds, at least 1200 pounds of feed would be required.

Another way to increase our production of poultry products would be to institute a better feeding, housing, management, disease and parasite control program. Many small flocks of poultry are fed only a few scraps, supplemented by whatever grain may be found convenient. With these small flocks there is opportunity for a marked increase in the number of eggs produced if better feeding practices are employed. Better housing does not involve the construction of elaborate houses. A house that pro-

ducts primarily from wind and rain is suitable usually. Included in better management would be getting rid of old, unprofitable hens, culling the slow-developing pullets, and, where available, using artificial lights, especially with late pullets. To control diseases and parasites the houses should be kept clean and the bird treated to keep them from such parasites as lice and mites. From a practical standpoint, poultry diseases are controlled or prevented, not cured. This means good sanitation at all times.

Death losses are probably the greatest hazard a poultryman faces. Quality chicks from stock free of the pullorum disease, adequate heat during early brooding, and good sanitation are the best life insurance for fryers.

With the increase in cost of chicks and also of feeds many people are doubtful as to whether or not they can realize a fair profit from their ventures. While costs of production vary and market prices also vary greatly, it seems safe to say that fryer production during the fall and winter will yield a fair return if an increase of 20 per cent or more in the normal price of birds can be secured. With the prevailing prices of other meats, such increase in poultry meat would certainly not be out of line.

—THE AGRARIAN—

## Dr. George M. Armstrong

Continued from page seventeen

the way out there before he was able to fool a girl into marrying him. Dr. and Mrs. Armstrong have two sons, one of whom entered Clemson as a freshman this year.

It has been said that no one can help but like a man who smiles all the time, and such is the case with "Doc." His pleasing personality and friendliness make him one of the best liked Profs on the campus. All of the boys who have classes under him say that he is really tops.

—THE AGRARIAN—

## Prof. Franklin S. Sherman

Continued from page seventeen

fishing and smoking his pipe. His hobbies mainly center around one of his earliest ambitions, to be a naturalist. He enjoys collecting insects and compiling records of the animal life of a region. Since he became associated with Clemson, the college insect collection has been built up to 250,000 specimens. When he first came here there was scarcely any collection at all, the fire a few years before having destroyed it completely. At most anytime Mr. Sherman can be found sitting behind his desk adding information to the large set of files that contain the records of South Carolina's animal life, the faunal survey.

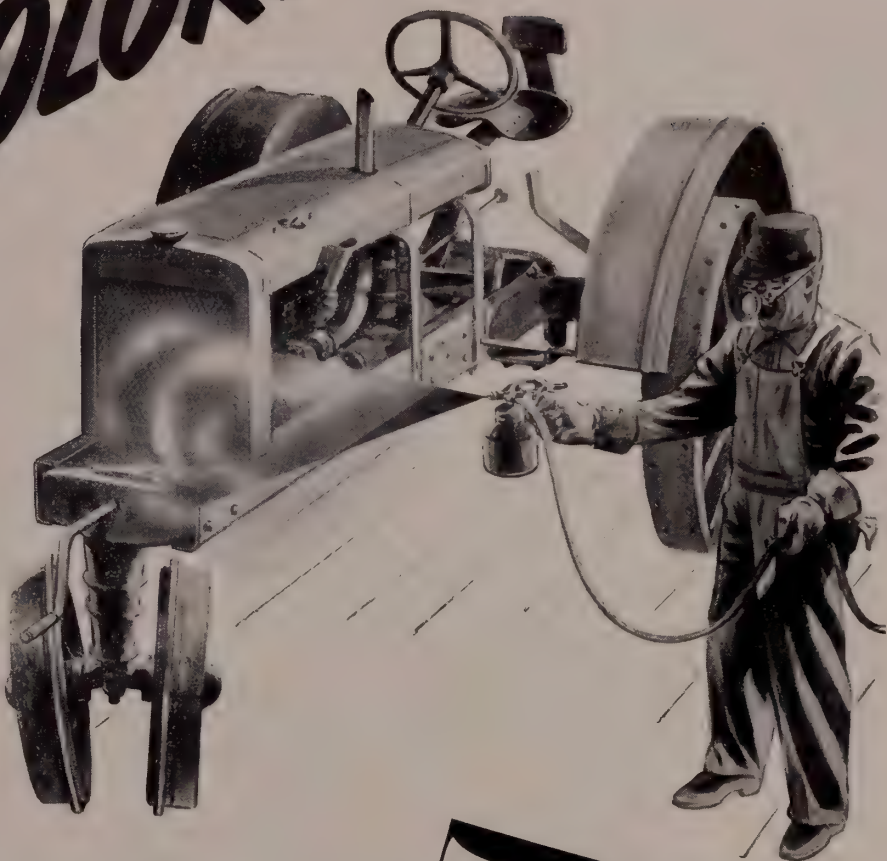
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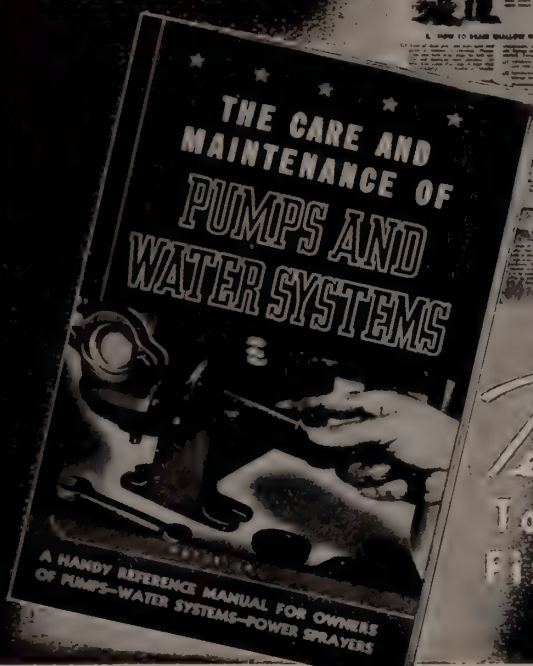


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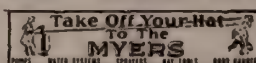
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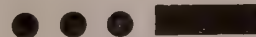


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# GROWING BETTER VEGETABLES

*Eradication Of Vegetables Diseases And Insect-Pests Facilitate Quality And Production*

By A. S. Waldron, '44

Were it not for plant diseases and insect pests, home grown vegetables could be much more easily produced. Early precautions in controlling vegetable diseases are a large part in the determination of success or failure in growing vegetables. Better growers select ways that are available to wage a successful fight against those enemies. If everyone will understand and follow such practices a better crop can be assured.

Seed should be selected from a reliable, well-established seed company. It is very important to start with disease-free seed, as many diseases are seed borne. Be sure that all purchased seed are good, high-quality seed that have been grown under sanitary conditions. A good practice to follow is to treat certain seed with a good seed treatment material before planting.

We should pay particular attention to the way our garden plots are rotated from one location to another. Without use of this practice, our plots are apt to creat soil infestation with plant and disease producing organisms. The use of infected compost should be avoided. Best results are obtained from new clean soil in seed beds and plots. It sometimes becomes necessary to spray or dust vegetables for leaf diseases.

The following are some of the better disease-resistant varieties of vegetables used extensively in our home-grown gardens.

## ASPARAGUS

Rust, the most dreaded disease of this plant at one time, is now under control by the use of resistant varieties recently developed. Mary Washington and Martha Washington are highly resistant to rust and are good popular commercial varieties. They are carried by practically all seed firms.

## BEANS

Green snap beans are badly affected by a common bean mosaic which causes the leaves to become mottled with light and dark green areas. Mosaic is often spread with the seed, but it may be spread by insects. Recommended highly resistant varieties are Refugee U. S. No. 5, Idaho Refugee, and Wisconsin Refugee.

## CABBAGE

The most common disease of cabbage is Fusarium wilt, which is caused by a fungus living in the soil. Excellent varieties which are resistant to the fungus are: Jersey Queen, Marion Market, Globe, Wisconsin All-head Select, Wisconsin All-Season, and Red Hollande.

## CELERY

This plant is readily affected by a disease known as "yellows" if planted on the same ground rather than being rotated occasionally. The diseased plants are stunted and have a yellowish appearance in the woody parts of the stalk. Some varieties which

show resistance are: Michigan Golden, Golden Pascal, and Florida Golden.

## CUCUMBER

Mosaic, which is caused by a virus, causes dwarfed leaves, stunted plants, and small fruit. A suitable large slicing cucumber which is resistant to mosaic is a variety known as Shamrock.

## LETTUCE

Brown blight is a disease which affects lettuce growing in the southwest particularly. The plant becomes stunted, turns yellow, and gradually dies. Resistant varieties are necessary for use in infected fields. Some of these varieties are: Imperial C. D. and F and Imperial 847. They are also resistant to Downy Mildew, another common disease among lettuce.

## MUSHMELON

Powdery mildew is a common disease that affects melons. Severe attacks kill the leaves. Powdery mildew resistant cantaloup No. 45 is an excellent resistant variety.

## POTATO

Mild mosaic causes a reduction in the vigor of plants and lowers the yield. It is recognized by dark and light green mottling of the leaves. Katahdin, Chippewin, Golden, and Houma are four varieties resistant to mosaic. Sebago is another variety recently discovered.

## PUMPKIN

Curly top is the most common disease among pumpkin. Cheese Group, Cushaw Group, and Big Tom are resistant varieties.

## TOMATOES

Fusarium wilt is the most common tomato disease in the southern states. A fungus enters the roots from infected soils and cause this disease. Affected plants produce leaves that roll, become yellow and die. Marglobe, Pritchard, and Glovel are resistant varieties to this and nailhead spot, another tomato disease. Riverside, Early Baltimore and Illinois Pride are resistant to both Fusarium and Verticillium wilt.

## SPINACH

Mosaic blight or "yellows" causes a curling of the leaves which later become yellow and die. Virginia Savoy and Old Dominion are resistant varieties of good commercial value.

## WATERMELONS

Fusarium wilt is the most dreaded disease of watermelons. The fungus that causes this disease is very difficult to get rid of once it is established in the soil. Plants affected wilt and soon die. Hawkesbury, Improved Keckley Sweet No. 6, Improved Stone Mountain No. 5, Leesburg, and Klondike—R, all offer the best solution to the wilt problem.

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# Farm Machine Production Cut to ONE-FIFTH!

**T**HE War Production Board on October 20 issued the 1943 Farm Equipment Limitation Order, fixing the amount of farm machinery which can be manufactured between November 1, 1942, and October 31, 1943. As this new order drastically affects the ability of the International Harvester Company to supply machines to its farmer customers, we feel that a brief statement is necessary in order that you may plan your future operations far enough in advance to safeguard the nation against any serious interruption in the Food-for-Freedom program.

## New Machines Cut to ONE-FIFTH

The purpose of the 1943 Limitation Order is to limit the entire farm equipment industry to produce for American farmers during 1943 not more than 20 per cent, or one-fifth, of the amount of new equipment that was built in 1940.

The government has further adopted the policy of concentrating this limited production for 1943, insofar as possible, with smaller manufacturers. The 1943 Limitation Order therefore provides that preference shall be given to manufacturers on the basis of their size. A group consisting of the smallest manufacturers has the smallest cut in production, a second group of small to medium-size manufacturers comes next, and the larger companies have the largest cut in production.

The result is that the 1943 Limitation Order stops production completely on the great majority of farm machines heretofore manufactured by International Harvester. On a comparatively few machines we are permitted to continue production on a severely reduced basis. It means that our company's 1943 production will fall substantially below the 20 per cent of 1940 average for the whole industry. On a tonnage basis, our company's 1943 production of new machines will be only 14 per cent of 1940, and 12 per cent of the 1941 output. Other companies similarly classed as large manufacturers will be similarly affected.

## All Equipment to Be Rationed

As you have been previously advised by the United States Department of Agriculture, this small amount of new equipment will be rationed to farmers, under a rationing system established by the Department of Agriculture.

The 1943 production program was adopted by the War Production Board, in cooperation with other governmental war agencies, as a part of its plan to curtail use of steel and other critical materials so as to increase the amounts available for the production of ships,

planes, and weapons of war. Only the government could decide a question of such far-reaching importance.

## Harvester's Wartime Pledge

Our company, of course, is keenly aware of the shortages of manpower and equipment with which farmers in many sections of the country are contending. Much has already been done by resourceful farmers and many patriotic groups to overcome these handicaps. Governmental agencies are undertaking to deal further with the problem. We are sure that the farmers of the nation will make every effort to produce the food required in 1943.

The International Harvester Company desires to state clearly that it will cooperate earnestly with the government's 1943 Limitation Order. We pledge anew to the farmers that we shall do our utmost, within these limitations, to help them with their equipment problems in 1943.

We can be of greatest help to our farmer customers in every community by continuing to supply them with repair parts and services for the McCormick-Deering equipment on which they have relied for so many years. The 1943 Limitation Order permits production of substantially the same volume of repair parts as produced in 1942. Harvester will continue to produce repair parts up to the limitations of the order and available materials, and will do everything in its power to help the McCormick-Deering dealers maintain the best service facilities possible under wartime conditions.

## Put New Life in Your Old Machines!

The owners of McCormick-Deering machines can perform a patriotic service by ordering needed parts and arranging for service to keep their existing equipment in use for the longest possible time, thereby saving steel and other materials for war manufacture. McCormick-Deering dealers will make every effort, within the restrictions imposed on them, to carry adequate stocks of repair parts and maintain service men for that purpose. This should make it possible for our customers to continue using the machines with whose design, performance, and quality they are familiar, and to maintain their farm production at the highest possible levels under the circumstances.

For your country and your peace of mind, check over your machines and tools. *Make sure that you order all parts and service work in time for the job ahead!*

**INTERNATIONAL HARVESTER COMPANY**  
180 North Michigan Avenue Chicago, Illinois

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# INTERNATIONAL HARVESTER

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**PRINCE ALBERT.** Give him Prince Albert if he smokes a pipe. Give him the big pound of P. A. that spells smoking joy far into the New Year. Whether he's at camp, at sea, or at home, he'll welcome the National Joy Smoke. For mild, cool, tasty smoking, there's no other tobacco quite like Prince Albert.



# *The* Agriarian

OFFICIAL STUDENT PUBLICATION

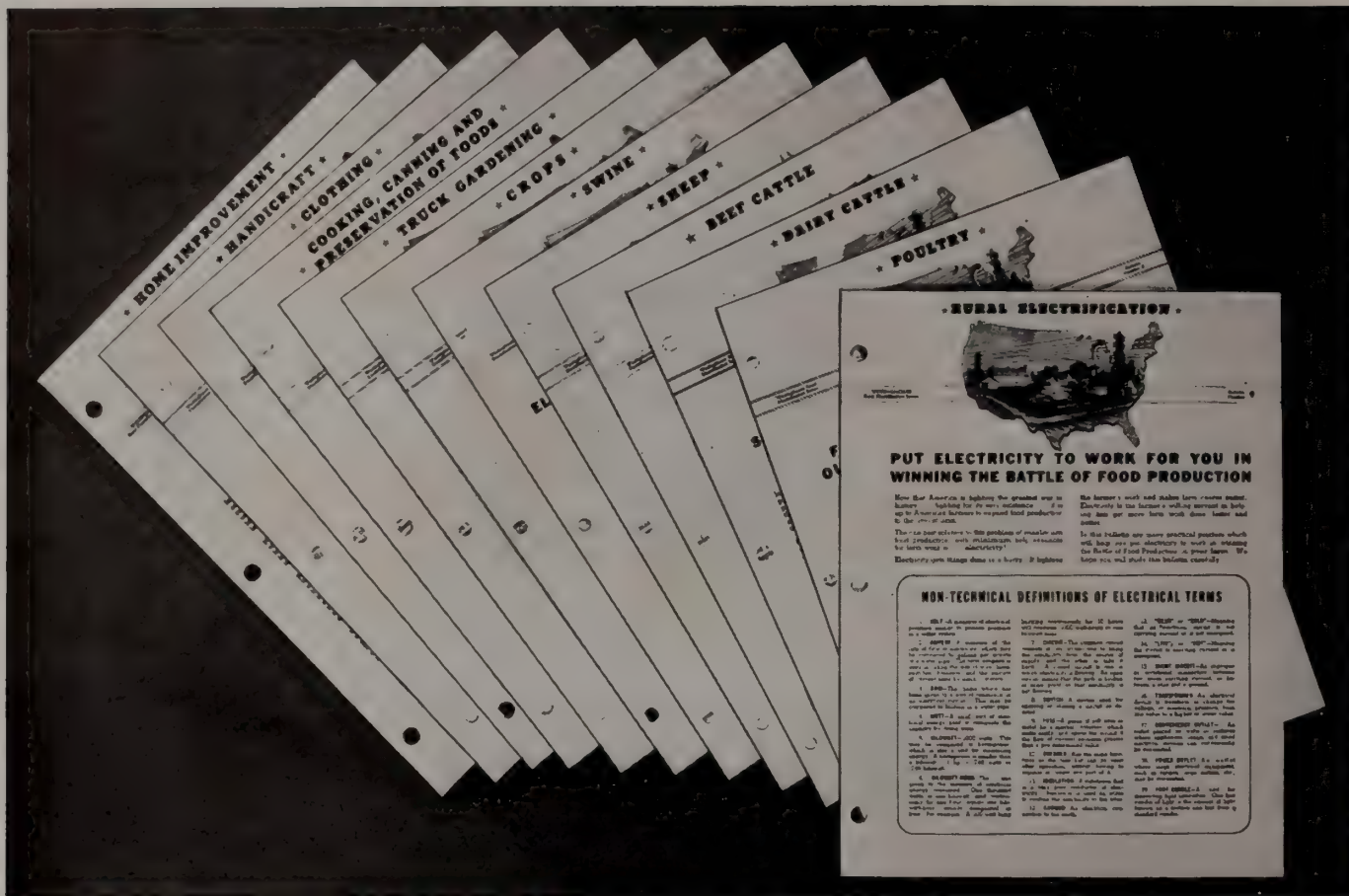
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# The Agrarian

OFFICIAL STUDENT PUBLICATION

Vol. 5



No. 3

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Shows Clemson's present main building where the first classes in agriculture were held. See story on our "School of Agriculture"

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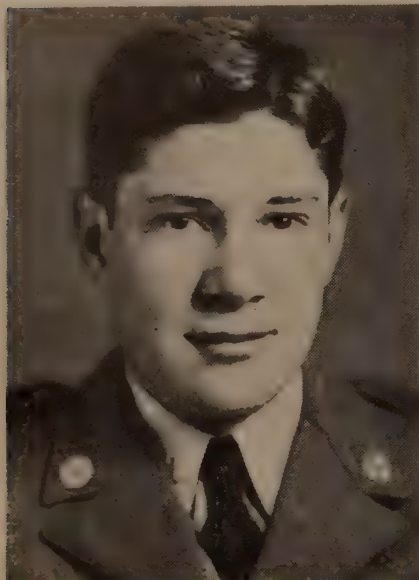
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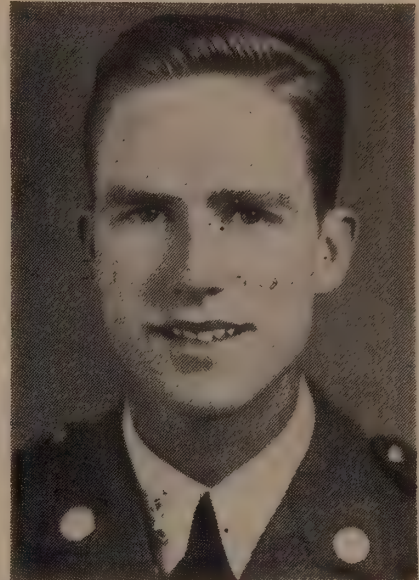
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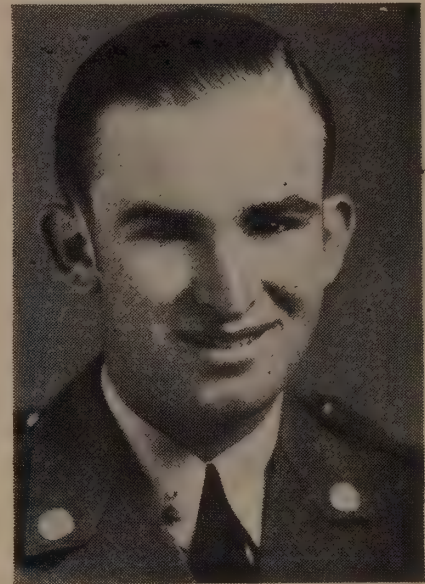
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# MARKETING SOUTH CAROLINA FARM PRODUCTS

GUEST EDITORIAL BY T. A. COLE

The subject of marketing South Carolina farm products is one that covers lots of territory—not that this is a large state—for it is not, but during the last few years it has become a diversified state. I often wonder how the fellow who once said, "How in the world can a poor man eat with 5 cent cotton and 40 cent meat," would feel if he were to see this state now with her diversified agriculture. Just to bring our thoughts up-to-date on what the state is doing along this line let's review a few figures on South Carolina production for 1942.

The statistics show that in 1942 South Carolina produced only 705,000 bales of cotton but produced 96,750,000 pounds of tobacco, 4594 cars of peaches, exclusive of motor truck movement, 3,225 cars of Irish potatoes, and 11,785 cars of other vegetables such as cabbage, snap beans, cucumbers, tomatoes, watermelons and others. In addition, approximately 3,114 cars of hogs, several hundred cars of beef cattle, as well as considerable quantities of poultry, eggs and dairy products were marketed in 1942.

Now all these things have to be marketed. A very high per cent of all these must be sold and shipped out of the state. This is a big job and the livelihood of many growers and their families depend on how well this is done. To properly merchandize these products, they must be distributed to the cities or communities where they are needed. This distribution is not quite as simple as some might think. Where volume and quality justifies the setting up of the proper organization, it can be done just as efficiently as the merchandizing of a standard brand of coffee. In fact, with some of our farm products the producers receive as high a per cent of the consumers dollar as is received by the manufacturers of some of our standard products. Manufacturers have never found any short-cut to marketing much more so than some of our best producers of farm products.

In preparing and selling these farm products we have used several of the practices carried out by manufacturers in selling their products. However, one of the great basic pillars upon which they built their wide distributing and merchandizing systems has been adapted by the farm produce handlers very reluctantly. This great pillar is standardization. The main reason it took years and much work to make it apply to farm products was because it had to be modified and applied in a different way but made to get the same results. The manufacturers did it with their brand names. Just try and visualize a hat manufacturer in this state calling a firm in another state and trying to sell him a shipment of hats and the prospective buyer did not know his line of hats

and he did not have his brands established. There would be no cash F. O. B. sale made. He would have to send them on approval or consignment. In like manner the fellow trying to sell farm products must have some established brand name or some standard by which he can make the buyer know what quality he is offering for sale.

Owing to the great number of sellers of farm products and also great numbers of producers, it is not possible to ship always under a known brand and if it were, to make a brand much it must be based on some standard of quality. Therefore, the standards of quality set up by the U. S. Department of Agriculture are doing for farm products what known brands are doing for manufactured articles. These standard grades, combined with a wise inspection policy established in this state several years ago, have made it possible for most of South Carolina farm products to be sold on a cash F. O. B. basis. Of course, there are always a few cases where products may deteriorate in transit. The percentage of this is very low except under unusual weather conditions. This practice of selling products rather than consigning them is the only way to get distribution, and prices depend to a great extent on how good your distribution is being handled. It sometimes becomes necessary or even advisable to consign cars, but when a deal is run on a consignment basis most cars will be consigned to a few of our larger markets, resulting in a few heavily loaded with low prices. Break the New York market and you have demoralized prices. Therefore, it is necessary to standardize so that sales can be made before shipment, or while cars are rolling for diversion. Cars of fruits and vegetables are often sold on future contracts, as well as cotton and corn. These are all based on Government grades. In other words, a car of peaches packed according to grade and covered by a certificate can be sold or bought by wire in any of the states or foreign countries. That was why our peach shippers were able to sell cars of peaches in over thirty of the forty-eight states and many into Canada. Sales were made as far west as Wyoming this last year. This was a wonderful job of distribution. It was not made possible by any one or two men but by the hearty cooperation of growers, shipping organizations, transportation people and Federal-State inspectors working together to put out and distribute a standard product of high quality. Over 95% of the cars shipped out graded U. S. No. 1 or better.

The next best standardization product we have is Irish potatoes and our distribution on these was just about as good considering the number of cars.

continued on page twenty-two



# PORK PRODUCTION IN SOUTH CAROLINA

E. W. ALLEN, '44

## SOUTH CAROLINA THIRD IN SOUTHEAST HOG PRODUCTION

The hog is by far the most valuable farm animal in utilizing farm wastes and in converting the concentrates raised on the farm into a marketable product. The place and importance of the hog enterprise in South Carolina farming are constantly changing. Hog production in South Carolina has to compete with cotton, tobacco, the main enterprises, and also with the Corn belt which has a number of comparative advantages. Hog production in South Carolina has been slow in developing, however in the past few years the enterprise has increased by leaps and bounds and has become one of South Carolina's paramount enterprises. Today the hog raising business of South Carolina is third in the Southeast, being exceeded only by Kentucky and Tennessee, two of the nation's leading hog producers. South Carolina hog producers shipped 62 per cent of hogs freighted out of the eight south-eastern states in the past year. South Carolina last year produced 6.2 per cent of hogs in the Southeastern states.

Hog production is quite naturally associated with growing of large amounts of corn or other concentrate. South Carolina's yield of corn is comparatively small as to that of the corn belt states. Our production averaging 12 to 15 bushels, whereas Iowa, Ohio, and Illinois average 35 to 40 bushels per acre. South Carolina must compete with this area, and in order to profitably do so we must and have found a satisfactory substitute in barley and wheat. Ground barley is practically equal to corn in feeding value.

Hog production is concentrated largely in the lower part of the state where also the greater part of the small grains are grown. Cotton production has decreased in that area since the invasion of the boll weevil, while small grain and hog production has increased feed crops and better pastures than upper state. This condition is an important factor in economical hog production.

South Carolina, as compared to the corn belt, has the advantage of inexpensive housing and year round forage crops, not possible in some of the corn belt states. The South Carolina producers receive higher prices for the better grades of hogs than do the corn belt states. This is true because the geographical location places the state in close touch with important northern markets. South Carolina is a deficit hog producing state. Favorable climate makes



Here's a fine start for any South Carolina hog producer

it possible to farrow and market earlier than in the corn belt. Seasonal fluctuation in hog prices have been advantageous to South Carolina, in that market prices have been higher from August to October than late in fall and midwinter. Prices usually decline again from October to December, since some of the fall farrowed pigs from the corn belt reach the market about this time.

South Carolina, not yet being a leading hog raising state, does not have sufficient markets and packing houses within the state to handle its swine. However, packing houses are being widely established over the state with an ever increasing demand for swine. Through efforts of local organizations of farmers cooperative shipments of swine are being made out of the state. Farmers by marketing their hogs in large lots are able to attract the attention of packing concerns who readily send buyers to the sites of these markets or the lots may be shipped to the central markets, Richmond; Baltimore and sold by mark through commission men. Both of these methods of marketing are gaining favor over the state.

As previously pointed out South Carolina can forage crops the year around. Forage is needed to supply the vital vitamin A and many necessary minerals. We have grains, oats, barley, or rye. For summer forage we may use soybeans, cowpeas, or rape. Seeding for temporary pastures must be heavier than for a grain crop. Many farmers favor

Continued on page twenty-three

# FEED A FIGHTER IN 1943

GUEST EDITORIAL BY DAN LEWIS



This 4-H member, Sam E. McGregor, Jr., of Richland County is milking two dairy cows this year. He also has a good brood sow and farm his club projects he plans to feed five soldiers in 1943. Last year from the proceeds of his 4-H work he bought \$300.00 worth of War Bonds.

Every 4-H member throughout the nation is being asked to produce enough food in 1943 to feed a soldier; and club members in any community or county are asked to grow sufficient food or its equivalent for the rural men and women in the armed forces from their locality. Old members are asked to secure a new member each to grow food.

This is a real challenge to 4-H members, 1,500,000 strong in the nation with 30,000 in South Carolina, to make a substantial contribution to the total war effort, and to line up their demonstrations to that end. In this way every 4-H member can just about know by name the person for whom he is growing food.

The accompanying table shows how a 4-H member may meet these food requirements. By growing food items listed in the table and expressed in column one as farm weights or amounts—"Annual food needs for a man in armed forces"—the club member can feed a soldier.

Another way is to produce 2506 quarts of milk, column two, with a cow project. The cow, column three, with a production of 5515 pounds of milk, will have produced the equivalent food for a soldier. The annual soldier budget in this respect is 1262 pounds.

That 4-H club member who grows 4,900 pounds of mixed vegetables, 8,323 pounds of Irish potatoes, 7,077 pounds of sweet potatoes, 6,584 pounds of tomatoes, or 2,770 pounds of beans has produced the food equivalent for one soldier.

That club member who produces 769 pounds of chicken has produced the food equivalent for a soldier. This would be 500 broilers or 250 baking chickens. Another poultry project large enough in scope to feed a soldier would be 50 layers averaging 10 dozen eggs each for the year.

The table suggests the food equivalent for a soldier for many projects indicating its size to meet these requirements. Hence in South Carolina, 4-H members select and adapt their crops and livestock projects to types of farming which give them greatest food production returns for their efforts.

Besides their regular 4-H projects, club members help with the general farm labor of which there is a shortage. They are gearing their efforts into the BFL Program, in an effort to produce

Annual food budget for a man in armed forces

Food Items	Annual food needs for man in armed forces	Amount farm products equivalent to annual food budget	Approximate size of 4-H project needed in a given field of production
Cereals	274 lb.	7,785 lb.	8-10 acres wheat or 3-4 acres corn or 3-4 acres rice
Milk	200 qt.	2,506 qt.	1 cow producing 5,515 lb.
Meat (live weight)	365 lb.	1,262 lb.	3 beef cows and calves, or 4 steers, 9 months, or sow and 7 pigs to 200 lb. or ewes producing 16 lambs
Chicken	57 lb.	769 lb.	500 broilers or 250 baking chickens
Butter	30 lb.	395 lb.	316 lb. B. F.-1 cow, 12 mo.
Eggs	30 doz.	470 doz.	50 hens, 10 doz. eggs each
Tomatoes	34 lb.	6,584 lb.	3-5 acres tomatoes
Potatoes	250 lb.	8,323 lb.	1-1.25 acres potatoes
Sweet potatoes	14 lb.	7,077 lb.	1-1.25 acres sweet potatoes
Onions	45 lb.	6,550 lb.	3-5 acres onions
Dry legumes (beans and peas)	10 lb.	2,770 lb.	2-4 acres beans or peas
Leafy, green, or yellow vegetables	168 lb.	4,900 lb.	2.5-3 acres English peas or 2-2.5 acres snap beans, or .5 acre carrots, or 1 acre mixed vegetables
Citrus fruits	105 lb.	9,590 lb.	8 acres oranges, or 8 acres grapefruit
Dried fruits	17 lb.	7,115 lb.	2 acres peaches, or 2 acres prunes, or 1.2 acres grapes
Other fruit (fresh basis)	91 lb.	5,090 lb.	1 acre peaches, or apricots or 1.5 acres apples.
Sirup (sorgo or sugarcane)	11 lb.	2,160 lb.	1.25 acres sugarcane or 2.5 acres sorghum
Jams and preserves	11 pt.	822 pt.	882 pt. jams and preserves or 1700-1/2 pt. jelly
Sugar	68 lb.	5,755 lb.	1.5 acres sugar beets, or 2.0 acres sugarcane



**FEED A FIGHTER**

continued from page nine

75 per cent or more of the food and feed needs of the family.

The Food Guide for the Family shows the different amounts of various food items necessary to feed one member of the family. The 4-H member in his club program determines the amount necessary to meet the family needs. After planning with parents, he agrees to do certain farm chores related to that production, keeping a record of the total production and the work he did in producing it. This latter is his labor contribution to the family BFL Program.

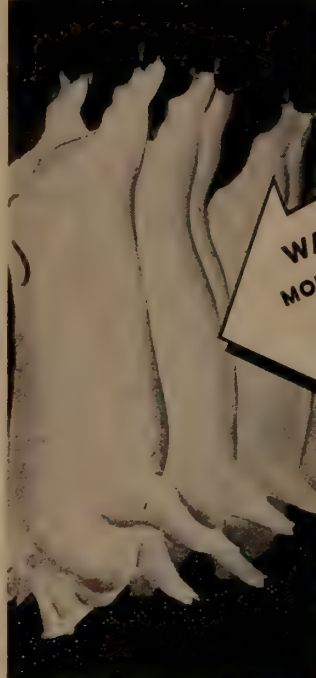
Farm families producing 75 per cent of their food and feed seeds are awarded Better Farm Living certificates for their accomplishments. Their children as 4-H members are awarded annual club certificates for completing a year's 4-H work with a Victory 4-H Record.

—THE AGRARIAN—



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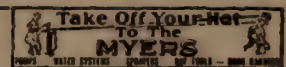
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# THE DEVELOPMENT OF CLEMSON'S SCHOOL OF AGRICULTURE

BY W. H. EADDY '44

## THOMAS G. CLEMSON'S DREAMS REALIZED

In 1886 the farmers of South Carolina formed a convention and passed a resolution advocating the establishment of an agricultural college. Thomas G. Clemson, son-in-law of John C. Calhoun, died in 1888 leaving as a bequest to the State the old Calhoun homestead, Fort Hill, consisting of about 800 acres of land and \$80,000 in other securities for the purpose of establishing an agricultural college. The college was established in 1889 by the act of the General Assembly.

The object of the college, in conformity with the Acts of Congress and the State Legislature, was to give practical instruction in agriculture and mechanical arts. The principles and applications of the science bearing upon agriculture and mechanics were given careful instruction to accomplish this object in its highest sense. Liberal courses were provided in history, economics, and English to give breadth and culture necessary for a rounded education.

The college is located in the foot hills of the Blue Ridge Mountains on the dividing line between Oconee and Pickens counties. The location presents an excellent view of the mountains to the north and west.

The principal academic building, now called the Administration Building, was erected in 1891. It contained twenty-two rooms including recitation rooms, library and reading room, literary society halls, laboratories for botany, entomology, physics, geology, and mineralogy, besides the offices of the president, the commandant, the treasurer, and the secretary of the Board of Fertilizer Control. Memorial Hall, the college chapel, adjoined this building.

A series of rooms in the Administration Building were especially constructed for the use of the library. About 3,500 volumes of standard English, literature, history, biography, general science etc., and over 1,000 volumes of government publications were on the shelves. Special efforts were made to procure all available books on South Carolina history and literature. Many volumes of books were added each year. The agricultural division was located on the first floor occupying several rooms.

The old headquarters of the South Carolina Experiment Station, one of the oldest buildings on the campus, was located on the site now occupied by the library building. The Experiment Station was organized at Columbia in January, 1888 as a department of the University of South Carolina. It was moved to Fort Hill in 1890 and re-organized as a

department of Clemson Agricultural College. The analysis and control of fertilizer, experiments with fertilizer and with field and garden crops were its principal line of work. The purpose was to bring practical information to the farmer and give him the results of scientific investigation in the interest of agriculture.

The first Dairy Building was located where the amphitheatre now stands. This building, at that time, was a structure of then modern design and was constructed especially to illustrate the most approved methods of dairy practice.

A spacious and well-equipped green house, a canning house, and a packing house with a brick basement was constructed and used by the Horticultural Division.

The equipment of the Veterinary Department consisted of an operating house with several stalls in which animals requiring care were kept. A veterinary pharmacy was connected with this building.

A new agricultural building, Agricultural Hall, was erected in January, 1904. It was built on the ground that the old South Carolina Experiment Station once occupied, or where the library building now stands. The old experiment station was moved back several hundred feet and converted into a residence. The Agricultural Hall building was built in Colonial style and constructed of red side-cut brick with columns and trimmings of colitic limestone. Classrooms and laboratories for instruction in agriculture, horticulture, soil physics, botany, bacteriology, zoology and entomology, veterinary science, dairying and animal husbandry, geology and mineralogy, and offices of the Experiment Station were provided in the agricultural building. It also contained a natural history museum and a gymnasium.

The Agricultural Hall was completely destroyed by fire April 8, 1925. This building was considered to be one of the most beautiful on the campus and the loss was felt severely by the college. Damage in actual money value was estimated to be over \$200,000. Among the things lost were experimental records of the South Carolina Experiment Station and scientific collections belonging to the college and members of the faculty. Classes which were normally held in this building were held in the Y. M. C. A. and other available places on the campus and class work proceeded without very much interruption.

This building was re-built and completed in April 1926. On the exterior the building resembles

Continued on page twenty-two



# THE AGRARIAN PRESENTS

FRED HARVEY HALL CALHOUN, PH. D.

FORMER DEAN OF SCHOOL OF AGRICULTURE—A TRUE LEADER



DR. CALHOUN

As this writer walked into Dr. F. H. H. Calhoun's office for an interview, he was at once impressed by the number of geological specimens and fraternity membership certificates which he saw on the walls of the room. When told that he had been selected by *The Agrarian* to be featured in this issue, Dr. Calhoun seemed slightly embarrassed and definitely surprised that he should have been chosen.

Beginning the conversation, Dr. Calhoun gradually began to tell some of the more interesting features of his long and varied professional career.

After graduating from the University of Chicago, he returned to that institution to do graduate work in his chosen field, geology, and to teach. His excellent scholastic record enabled him to hold fellowships and scholarships during this time, and in the summers he worked for the United States Geological Survey as an assistant geologist in Montana. It was here that he obtained material for his thesis, and the rich background of practical knowledge

which was to prove so valuable for instruction purposes in the classroom. His research was later published as professional paper No. 50 of the U. S. Geological Survey.

After obtaining his doctor's degree in geology, Dr. "Rock," as he is fondly known by his students,

taught for two years at Illinois College. He was then offered a position on the faculty of the School of Agriculture at Clemson and accepted, coming here in 1904.

He rose from a faculty member to assistant director, and later director, of resident teaching at Clemson in the School of Agriculture, and remained in this position for sixteen years. In 1932, he was appointed dean of the School of Chemistry and Geology, and has continued in that capacity until now.

Dr. Calhoun is an active member of a bewildering number of organizations. He is one of the few Clemson faculty members who are listed in "Who's Who In America" and "American Men of Science," publications listing outstanding personalities in many fields in this country. In addition, he is a fellow in the Geological Society of America; a member of the American Association for the Advancement of Science; a past president of the South Carolina Academy of Science; and was a member of Phi Delta Theta, a social fraternity, while in college as a student.

Since he has been at Clemson, Dr. Calhoun has become affiliated with a number of student organizations, both as an adviser and as a member. He is a member of Phi Kappa Phi, national honorary scholastic fraternity; a brother in Alpha Zeta, national honor fraternity for agricultural students; a member of Alpha Tau Alpha, professional fraternity for agricultural education students; a member and faculty adviser of Alpha Phi Omega, national service fraternity; and a member of Alpha Chi Sigma, national honorary chemistry fraternity; he also is a Rotarian. He was captain of University of Chicago track team in 1898, and coached Clemson track teams for many years. While coaching the Clemson teams, they lost but two dual meets.

Dr. Calhoun has also been associated with many projects of national importance, one such being the proposed Florida Ship Canal across the center of Florida from the Atlantic to the Gulf of Mexico. He testified before the Senate Investigating Committee in Washington as to the detrimental effect that the canal would have on the water supply of lower Florida, and his evidence proved valuable in convincing Congress of the danger to the rich agricultural lands of the southern part of the state through such a project.

He was also geologist for the South Carolina Public Service Authority in advising them on the huge Santee-Cooper power development in the lower part of the state which was recently successfully completed. His advice proved valuable to the au-

Continued on page twenty-three

# THE FARM OUTLOOK

A. L. FLOWERS, '44.

## A BIRDSEYE VIEW OF THE FARM PROBLEMS OF TODAY

In time of war, there are many problems which arise that affect each individual either directly or indirectly. The average American doesn't like to face these problems. Far too many of us are prone to turn away and let someone else take our responsibility. Today we face a threat of a dangerous food shortage. There is no other problem of more importance or more directly concerned with every individual than the food situation. This is a problem which affects every American from the man back of the plow to the man behind the gun.

We all know that we must have sufficient food for the people at home, we must have food for our Army and Navy, and we must have food for our Allies. Where is all the food going to come from if the present farm labor shortage is 3,500,000; the total of new machinery for 1943 only 40% of the 1941 output, and fertilizer materials are reduced?

One of the latest attempted solutions of the farm labor problem was advanced by our Claude E. Wickard, Food Administrator, and Manpower Chief Paul V. McNutt. They proposed that we have a voluntary "Land Army" of 3,500,000 recruits to rush out to the farms in their spare time to plant and harvest crops. It will probably be swallowed hook, bait, and sinker by millions of well-meaning Americans who never saw any soil except what they trampled on in a subway. The fact is however, that we cannot solve the food shortage by any such childish maneuvers. We have to be practical; we cannot take the members of some adventuresome club, show girls, psychologists, beauty operators, bell boys or other spare hands to meet the farm labor shortage. We will have to face the fact that this will never, never, work particularly in the presence of federal wage competition.

Agriculture doesn't just happen. It takes men of skill just as any other occupation and not just two or three weeks to learn the art. I think the appropriate words to express the situation are those of Mr. Churchill, "It takes blood, sweat, and toil and tears."

The latest and most practical plan to relieve the farm labor shortage is an agreement by our government to grant furloughs to army men who have had farm experience to help plant and harvest farm crops. I believe this is a splendid idea and it will help to reduce the labor shortage greatly.

We have another source from which we can draw and I believe it will be necessary.

Our high schools and colleges have thousands of students who have had valuable experience in farm work. We must have more efficiency from each

worker if we expect to increase crop yields with less labor. Therefore, I am convinced that the youth of our farms who have had farm training can bring about this efficiency of labor more quickly than a voluntary army of green hands. Of course, we should not abolish our educational system during a war, but the most important thing before us now is to win the war. A war cannot be won without some sacrifice, so why not have our educational systems in the farm areas give a portion of each week during the busy seasons for farm work?

Farm machinery presents another problem. The actual farm machinery to be manufactured in 1943 is 40% of the output in 1940. The repair parts have been increased to 167% of the average production of 1940. These extra repair parts are being manufactured for two reasons: first of all, the old machinery in operation will have to be used more than has been customary, and secondly, each machine is aging which will naturally increase repair requirements.

How can an increase in crop production be made when the new farm machinery has been reduced to 40% of the 1940 production? The best answer is to further increase labor efficiency by operating the available machines with trained laborers that can service, adjust, and lubricate machines so that the maximum efficiency can be obtained from each machine. Labor efficiency can also be greatly increased by operating the available machines at night. Tractors and implements need no rest. They need only be serviced and lubricated at proper intervals.

The last and least serious problem of the three is the fertilizer situation. It is not so much of a fertilizer shortage as it is transportation difficulties. However there is an estimated 54,000 ton reduction in nitrogen-containing fertilizer compared with 1941, but the calculated potential demands for 1943 are 257,000 tons higher than the expected 1943 output. In the case of phosphates and potash, the expected output in 1943 will be the same as in 1941, but there is an increased demand above the 1941 output due to the increase of farm cash income.

In conclusion, I might say that it is my belief that the majority of American farmers are willing and ready to give all they have to the production of food to win this war. The majority of farmers are not squealing for higher prices as is the case in many industries. The farmers have been sadly misrepresented in this respect by a small minority. What they do want is enough skilled labor, machinery, and fertilizer and they will prevent any serious food shortage.





# BETWEEN THE

## AGRICULTURAL CLUBS

The five Departmental Clubs are having five joint meetings, one each month from January through May. Each club is arranging for one program. Usually, outside speakers are obtained. These meetings are designed to be interesting as well as extraordinary. All students, whether members of these clubs or not, are urged to attend these meetings since they are proving well worth while.

—THE AGRARIAN—

## ALPHA ZETA

Dr. J. B. Edmonds, of the Horticulture Department and Dr. G. H. Wise, of the Dairy Department, were guest speakers of the two February regular meeting of Alpha Zeta, National honor Agricultural fraternity. At the first meeting, Dr. Edmonds spoke of his experiences at a recent meeting of southern agricultural leaders. Particular emphasis was placed on the sweet potato and what products are being made from it. Dr. Wise spoke on character and its importance as an element in determining membership for Alpha Zeta.

—THE AGRARIAN—

## CLEMSON 4-H CLUB

The 4-H Club has had some very interesting meetings this year with men such as Mr. Dan Lewis, Prof. Goodale and Prof. Bing to lead the discussion. We feel that our club has been successful even though we have not accomplished all that we would like to.

The Clemson club has never before purchased club keys or at least not in several years. All 4-H Club members who have attended 50 per cent or more of the meetings and wished to purchase keys were allowed to purchase them this year.

—THE AGRARIAN—

## ALPHA ZETA ELECTS "WORMS"

At a meeting of Alpha Zeta on Thursday night, March 11, Dr. G. M. Armstrong spoke to the fraternity on the fungicide and insecticide situation.

Following his talk the following new members were elected on the basis of their leadership ability, character, and scholarship: Sophomores: J. A. Stewart and G. S. Barker; Junior: W. B. Camp; and Seniors: E. M. Dubose, J. T. Ford, F. P. Cuthbert, and V. L. Warner. Dr. G. H. Aull was also elected as an associate member.

## ALPHA TAU ALPHA

Professor Frank Sherman, entomologist, spoke to the Clemson Chapter of Alpha Tau Alpha at the "Y" cabin on the subject, "Birds and Animals in the Locality of Clemson."

After the talk, a steak supper was enjoyed by the following: Ralph Hoffman, Georgetown; C. B. Lowman, Inmo; W. S. Jackson, Manning; L. R. Cox, Moncks Corner; L. E. Pence, Tatum; R. M. Richbourg, Camden; C. H. Brown, Traveler's Rest; W. A. Collins, Mullins; N. J. Thomas, Knoxville, Tenn.; C. S. Hughey, Greer; W. F. Minton, Lewiston, N. C.; R. E. Linder, Chapin; J. E. Herlong, Saluda; and C. B. Pence, Tatum. Also professors J. B. Monroe, B. H. Stribling, and W. G. Crandall, faculty advisors.

—THE AGRARIAN—

## AG. BLDG. NO MORE

Nevermore shall we refer to the building that houses Clemson College's School of Agriculture and the South Carolina Extension Department as the Ag. Building. This building was named in honor of Dr. W. W. Long and meant to be called **Long Hall**. So from now on we would appreciate it if everybody in the college (administration, faculty, students, extension and experiment station workers) would follow our policy and hereafter refer to this building as **Long Hall**.

—THE AGRARIAN—

## ATTENTION BEEKEEPERS

The farmer who is a beekeeper will find these warm days of spring excellent for checking over the condition of his bees. Burr and brace combs, and excessive propolis should be cleaned off the frames and inside of the hive. If a colony did not survive the winter, the hive entrances should be closed to keep out robbers. Weak colonies will have to be strengthened by combining with another colony or by the addition of package bees if the beekeeper expects his bees to gather enough honey to supply his table.

—THE AGRARIAN—

## Air Corps Boys Meet Classes In Long Hall

Clemson's agricultural students are becoming "reconciled" to seeing the well-known army uniform in their beloved Long Hall. The air corps men "invaded" the college campus about the first of March and started meeting classes a week later. The sub-



# FURROWS

jects being taught are mathematics, English, history, geography, and physics. There are about 150 men in the group. Practically all of them are northerners, but that doesn't alter the friendly feeling existing between these boys and the Clemson students.

The classes are being held in the Main building, Textile building and Library, in addition to Long Hall.

## —THE AGRARIAN—

### Won't You Oblige With a Polite Smile?

Charlie McCarthy: "Bergen sure is a modern man."

Mortimer Snerd: "Whyyyyy sooo, Charlie?"

Charlie: "Why last night he threw his voice under an old maid's bed, and boy, was she disappointed."

"Mother, there isn't any harm in walking in the park with a soldier after dark, is there?"

"No, not if you keep on walking. During World War I I often went walking with soldiers in the park at night."

And did you keep on walking?"

"Hush, girlie, its time for you to go to bed."

Minister: "I was awfully glad to see you at the prayer meeting last night."

Drunkard: "Ah, ha, so that's where I was, was I?"

Dad: "When I was your age, I used to go to bed with the chickens."

Son: "Well, Dad, times have not changed a bit."

A man's intellect is judged by his ability to disagree without being disagreeable.

Two slightly intoxicated gentlemen walked into a public dance hall. One asked the location of the cloak room and was told to take the first door to the right and to go down three steps. Due to the liquor-logged condition of his brain, he got the elevator door by mistake and fell five stories to the basement. His friend watched his sudden departure through the door and then called out:

"What are you doing down there?"

After a short pause the answer came floating up the shaft.

Hanging up my coat Look out for that first step—Its an awful one.

### DID YOU KNOW THAT:

Dr. W. T. Ferrier of the Agricultural Economics Department was at one time president of a Colorado Ranch Corporation.

Professor L. V. Starkey who has been head of the Animal Husbandry Department since 1919 is considered one of the most outstanding beef cattle judges in the South.

Dr. W. H. Garman of the Agronomy Experiment Station staff is the author and co-author of several scientific publications in the fields of soil, chemistry, and fertility. Dr. Garman was assistant chemist at Texas A & M College for two years and professor of Agronomy at the University of Georgia for three years.

Dr. G. H. Aull, head of the Agricultural Economics Department, has been appointed a public member from South Carolina in the Regional War Labor Board.

A large percentage of the beef and pork being served in the Mess Hall now comes from the Animal Husbandry Department. The cattle and hogs are slaughtered by senior Animal Husbandry students under the supervision of Professor R. R. Ritchie.

Professor J. P. LaMaster who has been head of the Dairy Department since 1920 is a member of the American Association for the Advancement of Science. Professor LaMaster is vice-president of the Southern Section of the Dairy Science Association.

Dr. M. J. Peterson, Assistant Agricultural Economist, once coached wrestling and played semi-pro basketball in Minnesota.

The college herd of Hereford beef cattle and Berkshire hogs are among the most outstanding herds in South Carolina.

Dr. P. G. Miller of the Dairy Department has won much fame through the success of his Blue Mold cheese investigations, using the historical Stumphouse Mountain tunnel near Walhalla for aging the cheese.

Three professors in the Agricultural Economics Department are members of Phi Kappa Phi, an honorary scholastic fraternity. They are Dr. G. H. Aull, Dr. W. T. Ferrier and Dr. M. J. Peterson.

Dr. J. B. Edmond, Associate Professor of Horticulture, was born in England.



# WARTIME USE OF FARM MACHINERY

GUEST EDITORIAL BY C. V. PHAGAN

A shrinkage supply of new machinery and a diminishing force of experienced farm labor are two of the big problems confronting South Carolina farmers in their attempt to increase production of food and feed crops essential to the war effort.

Limitation Order L-170 of the War Production Board stipulates that the amount of new farm machinery available in 1943 will be only 20 percent of the average amount purchased in 1940 and 1941. This deficiency must be made up by the use of repaired and reconditioned old machinery which normally would be junked. New repair parts, will be available for the reconditioning of machinery, but these parts are becoming more difficult to obtain. Limitation Order L-170, as amended, allows repair parts to be produced at the rate of 167 percent of the 1940 production as requested by the Department of Agriculture.

If food and feed production goals are reached in 1943, the farm machinery that is used must be operated on a wartime basis. This means—make it do and keep it running as efficiently as possible. There are several important steps that farmers should take in wartime use of farm machinery. These steps are outlined and discussed below:

Step 1. Check all machinery and equipment for needed repairs and buy or order repair parts early. Even though Limitation Order L-170 allows repair parts to be produced at the rate of 167 percent of the 1940 production, this is no guarantee that farmers will have all of the repair parts that they need if machinery is not checked sooner than usual and orders placed in advance of the anticipated needs. Of course, farmers are not able to anticipate certain types of break-downs but by an early check of machinery it is possible to determine those parts that are subject to severe wear and breakage such as bearings, gears, sprockets, and drive chains. Other important parts to check are those used in cutting and plowing such as knife sections, wearing plates, discs, plow points, etc.

One of the important things that farmers should do in ordering repair parts is to make use of instruction manuals that come with machines so that repair parts can be listed by the correct number.

Step 2. Make needed repairs during slack seasons. The decrease in the number of mechanics and skilled repairmen in local repair shops and garages makes it necessary that farmers take care of as many of their minor repairs as possible. The best

time, of course, to repair machinery is during the slack season or during bad weather when it is impossible to work in the fields.

Step 3. Preventive Maintenance. This is one of the most important steps in the wartime use of farm machinery. It means stopping trouble before it begins. One of the best rules to follow in connection with the operation of any machine is to make use of the instruction book that comes with the machine for correct methods of lubrication with oils and greases and for methods of operation and making adjustments. Lack of proper lubrication is no doubt one of the biggest factors contributing to the depreciation and wear of farm machinery.

Another important point in connection with the preventive maintenance program is to give machinery adequate protection during the idle season from rust and decay. Weather proof shelter and surface protection for machinery such as oiling, painting or varnishing is another important method of preventive maintenance.

Step 4. Share use of machinery for maximum production with minimum of equipment. With less new farm machinery available and increased quotas for many crops, renewed interest must be placed on the old custom of swapping work. This may be done on rental or custom basis, cooperative ownership of machinery or through the exchange of machinery use for the use of labor. It is recognized, of course, that many farmers object to renting or hiring out of their machinery, but under wartime conditions when there isn't enough to go around, more farmers will be willing to change their practices if this will contribute to winning the war.

Step 5. Practice Safety. With many new inexperienced operators of farm machines there is increased danger of accidents which, of course, will result in great loss to the food production program as well as to the possible loss of lives. Caution is the cue in working around farm machinery. Machinery and equipment that is in good repair and correct adjustment will minimize the chances for accidents. If tractor and combine operators will follow directions as given in instruction manuals there will also be less danger from accidents.

The steps as mentioned above indicate the importance of taking better care of farm machinery. Every machine that is repaired and kept working means more material and more power for the making of guns, tanks and other munitions of war.

# PROTEIN SUPPLEMENTS FOR HOGS

BY S. R. MCMASTER, III, '44

## USE MORE PROTEIN SUPPLEMENT AND SAVE GRAIN



Plant Proteins are now a very important feed for fattening hogs.

Our government is calling for the production of more beef and more pork to feed our ever increasing armed forces. The production of these meats is necessary to insure victory against the axis powers of Germany, Japan, and Italy. To meet this need farmers must not only produce more feed for their farm animals, but they must use it more efficiently. This may be done by supplementing the corn or other grain with high protein feeds or protein supplements. The Secretary of Agriculture is asking farmers to save grain and feed more high protein feeds. He warns, "If we don't use our feed supplies carefully, we will be scraping the bottom of our corn bin." He also states that, "Farmers in general can profitably increase the use of high-protein feeds," and adding, "Efficient use of high protein feeds will make the grain supplies go farther."

The high-protein feeds or protein supplements are divided into two groups, (1) those from animal origin consisting of fishmeal, tankage, meat scraps, and dried milk, and (2) those of vegetable origin consisting of soybean meal, cottonseed meal, peanut meal, and linseed meal. These are the chief protein supplements used in balancing the rations of livestock in this country.

Hogs require more protein per 100 pounds live weight than any other class of livestock. Some farmers still think that hogs can be raised on corn alone. This is not the case because hogs are fast-growing animals, and they need a lot more protein than they usually get in corn or other grains especially when they are under a hundred pounds in weight. Feeding authorities agree that protein is also highly important as a means of saving grain in hog rations. One hundred pounds of a protein supplement—such as cottonseed meal or peanut meal, combined with tankage or fishmeal, or a mixture of

two parts cottonseed meal or peanut meal, and one part alfalfa meal, and one part fishmeal will save 400 to 600 pounds of corn or other grain. It is estimated that as much as one billion pounds of corn could have been saved in the United States in 1942, alone, by the proper use of protein supplements in the hog rations feed.

The feeding of protein supplements also brings on faster gains. J. R. Hawkins, Clemson Livestock Specialist points out, "Five to six bushels of corn fed with 50 pounds of protein supplements will add as much weight to a hog in less time than ten bushels of corn fed alone."

The war situation has decreased the amounts of the animal proteins to a great extent. Very little if any fishmeal or tankage can be purchased. It has been estimated that the annual total supplies of fishmeal and animal protein feeds were in 1941 more than one million tons. Even though the slaughter of hogs in 1942 is from 18 to 20 per cent greater than in 1941, and the slaughter of cattle and lambs around 15 per cent greater, still the total amount of animal protein is less than a year ago. This is due to the fact that importations have been entirely cut off, largely because of the shortage of shipping space. Much of the tankage and meat scrap from the meat packing industry is now being used in the making of fertilizers. The decline in the supply of animal protein is estimated at 250,000 tons. However there was an increase of 500,000 tons of vegetable protein in 1942. This will allow an increase in the total protein feeds to be fed, but much of this vegetable protein has not yet reached the market. The 1942 crop of soybeans and peanuts has not yet been crushed.

Since animal protein supplements are the best for hogs, something must be found to take their place. Can a vegetable protein take the place of fishmeal in the ration of a pig? The soybean furnishes us with our most complete vegetable protein, yet when soybean meal was used as the only supplement in the ration of pigs under 100 pounds they did not do as well as those pigs which were allowed some fishmeal or tankage mixed with the soybean meal. This proves that a vegetable protein used as the only supplement is not sufficient, but when it is mixed with fishmeal or tankage or even with other vegetable protein, its value is increased greatly. Practical methods of combining cottonseed meal,

Continued on page eighteen



# AG HOUSE PERSONALITIES

## MR. L. O. VAN BLARICOM

J. H. CANNON, '44

## DR. E. J. LEASE

BY W. B. CAMP, '44

My first meeting with Mr. Van Blaricom was one that I shall always remember. It was then that I became aware of the way he so thoroughly carries on his work in a business-like manner, yet all the while his keen sense of humor, congeniality, and characteristic mannerisms remain dominant.

When I first spoke with "Van" as he is called by his friends about an interview for this article, I had no idea that he could supply me with such a vast amount of interesting material about himself. You would hardly expect such a quiet, mild-mannered man to do so much in the few short years of his life.

He was born in Hood River, Oregon, one of the big apple centers on the Columbia River. It was there on his father's farm in a valley between two snow-capped mountains that he spent his early life. Of course he did odd jobs about the farm, but the first job for which he received wages was hoeing a patch of strawberries. He never quite finished the job. Later he was paid by the month to milk a cow for a man who had hay fever and could not go near a barn.

In his junior year in high school "Van" met the girl who was to become Mrs. "Van" when he graduated from Oregon State College with a B. S. degree in Chemical Engineering. He became an assistant in the laboratories of the food industry department of Oregon State and received his M. S. degree in Food Industries. Since that time his work has been confined to this field.

"Van" belongs to fraternities in the fields of agriculture, chemistry, mathematics, and science. Also he is a member of several occupational organizations among which are the American Chemical Society and the Institute of Food Technologists. From the above you can see that it certainly cannot be said that his activities have been confined to only one field of endeavor.

After leaving college he was employed for six years as an assistant chemist in the shipping point inspection service making analyses for arsenic and lead on fruits. He worked in a fish laboratory for a while and then went to Portland, Oregon as a manufacturing food chemist for a commercial house where he remained until December, 1940 when he came to Clemson as an assistant in horticultural manufactures.

Since small units are not manufactured for canneries, Mr. Van Blaricom undertook the job of building approximately one-half of the equipment for the Clemson College Horticultural Products Laboratory. The cannery has been in operation for two years, and

Continued on page twenty-three

"Dr. Lease?—Never heard of him, who's he "

So that's what many of you are saying, is it? Well, you really don't know what you've missed if you don't know him or haven't taken his course in Human Nutrition.

Dr. Elmer John Lease came to Clemson in 1938 after receiving his B. S., M. S., and Ph.D. from the University of Wisconsin in Biochemistry.

Here at Clemson Dr. Lease is associate chemist in the Chemistry Department of the South Carolina Experiment Station, and for the last three years has taught a course in Nutrition to Clemson students. He is also on the State Nutrition Committee and is now collaborating with the Consumer Requirements Division of the Federal Government. You will have a hard time ever catching him in his office because along with the above duties he is a member of the Cereal Committee of the Food and Nutrition Board of the National Research Council, which is made up of a number of leading nutritionists, doctors, and prominent industrial men all located in various parts of the United States.

Dr. Lease is also a member of Sigma Xi, an honorary scientific fraternity, and many other clubs. While at the University of Wisconsin he won a National Research Council Fellowship for outstanding work which paid his way in obtaining his M. S. and Ph.D. degrees. Two years ago he won the Jefferson Medal for the best paper in the South Carolina Academy of Science. His paper was written about his research done in connection with dehydration of sweet potatoes. His work in connection with the enrichment program in South Carolina attracted the attention of Research Corporation, a non-profit organization for the promotion of scientific research, and Clemson College was granted several thousand dollars for research on the nutrition of the South to be used under the direction of Dr. Lease.

He helped originate a bill requiring the enrichment of flour, bread, and margarine and which was passed last year by the South Carolina legislature. The section applying to bread is now in effect all over the United States. Right now there is another bill before legislature, in which he is very much interested, requiring the enrichment of all degerminated corn meal and grits sold in South Carolina. This does not apply, however, to rock ground meal because it is whole and is far superior to degerminated products.

Dr. Lease met Dr. Lease (no it isn't a misprint, it's his wife's title) while attending the University of Wisconsin. Mrs. Lease obtained her Ph.D. from the

Continued on page eighteen



# What Will Their World Be Like?



When corn was planted by hand from a shoulder-slung sack and weeded with hoes and one-horse, one-shovel plows, few children went to high school. They were lucky if they got so much as six months of elementary schooling in a year. Schools closed early so that children could help with the sack and the hoe.

Corn is but a single sample of many crops; the sack and hoe but symbols of hand work and primitive implements. Be it wheat or cotton, turnips or tobacco, scant schooling still is the rule for children where scanty machinery still prevails in crop production.

Where seedbeds for corn are fitted with tractor-powered plows and harrows, planted with accumulative drop planters, weeded with two-row or four-row cultivators and harvested with a mechanical picker, children

have a chance. Most of them go through high school, many through college. And with education comes dental care, health supervision, hospitals for emergencies, homes with comforts such as few kings ever enjoyed.

## A Miracle of Freedom

On nearly a quarter of America's corn acreage it takes from two to three hours of human toil to grow and harvest a bushel of corn. Over the entire corn belt the average is a little less than half an hour per bushel; however, hundreds of farmers in one association have cut the labor per bushel to less than eleven minutes. The future that awaits the children who will be tomorrow's farmers is forecast by the fact that, on a research farm in Iowa, corn already has been produced with less than three minutes of man-time per bushel.

The machines which make possible

this modern miracle are built in factories, but they are created in the minds of men. They are the fruit of American freedom—freedom of any man to risk his fortune in the hope of success, freedom to stake his future on faith in his idea or his invention, freedom to earn rewards in proportion to the service he renders his fellow-citizens.

If we guard well these freedoms, a better world will rise for the farmers of tomorrow. To bear the burdens of war which we bequeath to them they will have not only the three-minutes-per-bushel machines already in sight but still greater machines to multiply still more a farmer's capacity in food production and in providing for his own and his children's security.

In the farming of the future, as in the century past, this company's purpose will be ever-greater service to agriculture. J. I. Case Co., Racine, Wis.



## TAKES CARE OF CORN FOR TWICE THE PORK

In the bottleneck of corn-belt farming, when cultivation competes with haying and perhaps with harvest, this man with his Case all-purpose tractor and front-mounted cultivator covers twice as many acres as he could with a team or one-row tractor. At fast tractor speed his sweeps or shovels scour better, cut or cover weeds more surely. He can use speed with confidence because he sees what he is doing, with ease because steering takes but little effort to give instant and accurate control.

SERVING AGRICULTURE *Since 1842*

# CASE





**PROTEIN SUPPLEMENTS FOR HOGS***Continued from page fifteen*

soybean meal, peanut meal, and other vegetable protein concentrates with limited amounts of fishmeal and tankage include such mixtures as:

(1) Two parts cottonseed meal, one part alfalfa meal, and one part fishmeal or tankage.

(2) Two parts fishmeal, one part cottonseed meal, and one part alfalfa meal.

(3) One part cottonseed meal, one part soybean meal, one part peanut meal, and one part alfalfa meal.

A widely used protein supplement for many years has been a half-and-half mixture of cottonseed meal and tankage or fishmeal.

The shortage of labor on many farms is being overcome by self-feeding of hogs. Self-feeding saves both labor and time. Whole grain may be placed in one compartment of a self-feeder and the protein supplement placed in the other compartment. The hog in this case will balance his own ration. This practice is practical in the feeding of both growing and fattening hogs.

—THE AGRARIAN—

**AG HOUSE PERSONALITIES—  
DR. E. J. LEASE**

*Continued from page sixteen*

same college as her husband. She has collaborated with Dr. Lease on much of his work, she is also a recognized nutritionist. The Lease's are the proud parents of a 3-year old child.

Dr. Lease was born and raised on a farm and his main hobby now is farming. The first thing Dr. Lease did when he got to South Carolina was to buy a thirty acre farm just a short way from the Clemson campus, and raise an acre of cotton, peanuts, sweet potatoes, and other southern crops. Because of lack of time in the past few years, to devote to this hobby, he has planted most of the farm to trees. He now has 15,000 Loblolly pine trees and some kudzu growing in order to build up the soil, prevent soil erosion, and maintain soil fertility.

Dr. Lease's other hobby consists of experimenting in the chemistry laboratory, mostly, as he says, "playing with white rats."

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We sell over 100 varieties of peaches and many varieties of apples, grapes, plums, cherries, raspberries, pecans, cider and canned ripe yellow freestone peaches, green asparagus, and frozen peaches and asparagus.

Many of these varieties have better appearance and quality than the varieties usually grown in home or commercial orchards. Try some of these delicious fruits next season.

**The Horticulture  
Department**

# PRACTICAL INSECT CONTROL FOR VICTORY GARDENS

BY J. H. CANNON, '44.



A little manual labor—results: a greater yield

Since the beginning of the war with the Axis powers, it has become increasingly difficult to secure the proper materials for use as insecticides, however, there are some materials of which there will be no shortage. Insecticides such as stomach poisons, contact poisons, and fumigants will necessarily have to be used where other control measures

will not suffice, but there are numerous methods of controlling insects that can be applied without the use of these insecticides. My intentions are not to low-rate the value of insecticides, but are to provide simple methods of controlling Victory garden insects without buying insecticides.

Hand destruction of many insects has proven of great value. The tomato hornworm can be picked off the tomato plants and crushed underfoot, as can the Harlquin bug on cabbage, rape, and mustard. Mexican bean beetles and other insects can be picked off of the underside of the leaves and killed likewise. By shaking or brushing over an Irish potato vine during the hotter portion of the day, the slugs of the Colorado potato beetle can be knocked of the plant onto the hot ground where they will die before being able to crawl back to the plant. This method of control can be applied to many more of the common garden pests. If the fruit of any plant is wormy, it should be picked and destroyed before the insect develops into an adult.

The use of cultural control methods is usually a great aid to successful insect control. Not only is

Continued on page twenty-one

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# SUMMARY OF CONFERENCE ON SWEET POTATO RESEARCH PROBLEMS

BY C. K. STUART, '44

52,000,000 POUNDS OF YAMS TO BE DEHYDRATED IN 1943

The growing of over 1,000,000 acres of sweet potatoes and dehydrating of 52,000,000 pounds of the fleshy roots in addition to increasing the production for consumption at home and for livestock has fallen upon the shoulders of southern farmers and food processors.

These goals were revealed in a southwide meeting of horticulturists, animal husbandmen and agricultural engineers at Auburn, Alabama, on February 3-4, 1943. The production and utilization of sweet potatoes for feed was considered the first day of the conference with attention centering on production methods, production machinery, natural drying, dehydration machinery and the feeding of sweet potatoes to cattle and hogs. Sweet potatoes for food was discussed in all phases during the second day, with special attention to production problems, dehydration and the operation of dehydration plants. In the production of sweet potatoes for feed, experimental data presented showed that growers can produce 300 to 400 bushels of sweet potatoes per acre by planting early on well prepared and adapted land, following improved cultural practices, and by using sufficient amounts of the proper fertilizers. The data also showed that the manpower needed in producing an acre of sweet potatoes can be reduced from 164 manhours to around 74 manhours by using home-made transplanters, rotary hoes, rod wing diggers and bagging cart or sled.

Although plant breeders have made excellent progress in developing improved varieties, the best available varieties for use this year are the Porto Rico, a yellow variety, for food, and the Triumph, a white variety, for feed. New varieties which promise to be better than existing ones for table stock and dehydration but which are still in the developmental stage are the L10, the Nancy Gold, and the L126. This latter variety in preliminary tests produces a total yield lower than improved strains of Porto Rico but a higher yield of No. 1 potatoes.

Eighteen different dehydrated sweet potato products were exhibited by Mr. L. M. Ware, Horticulturist of the Alabama Experiment Station. Some of the products tested by those in attendance at the meeting included: Flakes, wafers, shreds, chips, pudding, tapicoa cream, soufflé, pie, syrup, paste, biscuits and flour nuts (similar to grapenuts).

At present all dehydrated products are under contract for delivery to the government. The army has placed an arbitrary requirement that before a contract from them, which in turn is necessary for equipment priorities, will be let, a prospective plant must be able to process a minimum of 30 tons of raw material daily.

Sweet potatoes have gained a place of prominence as a food in the list of dehydrated vegetables wanted by the U. S. Quartermaster Department. The amount of dehydrated vegetables for which contracts will be let in 1943 by U. S. Government are:

Irish Potatoes, 120,000,000 pounds; sweet potatoes, 52,000,000 pounds; onions, 20,000,000 pounds; carrots, 13,000,000 pounds; cabbage, 35,000,000 pounds; turnips, 8,000,000 pounds; peas, 12,000,000 pounds; sweet corn, 20,000,000 pounds; snapbeans, 12,000,000 pounds; tomatoes, 18,000,000 pounds; greens, 15,000,000 pounds; soup mixtures, 200,000,000 pounds; and rutabagas, 9,000,000 pounds.

Subjects discussed by those appearing on the program included: "Potential Possibilities of Sweet Potatoes," by Dean M. J. Funchess, Director, Alabama Experiment Station; "The Production of Sweet Potatoes for Feed," by W. D. Kimbrough, University, Louisiana; "Sweet Potato Production Machinery," by J. W. Randolph, U. S. Department of Agriculture, Ellisville, Mississippi; "The Drying of Sweet Potatoes by Natural Means," by L. M. Ware, Alabama Polytechnic Institute, Auburn, Alabama; "The Artificial Dehydration of Sweet Potatoes for Feed," by Fred Kummer, Department of Agricultural Engineering, Auburn, Alabama; "Dehydration Machinery," by Ray Crow, Tennessee Coal and Iron Company, Birmingham, Alabama; "The Feeding of Sweet Potatoes to Beef Cattle and Hogs," by J. C. Grimes, Alabama Polytechnic Institute, Auburn, Alabama; "Seed Method of Planting Sweet Potatoes," by Otis Woodard, Georgia Coastal Plains Experiment Station, Tifton, Georgia; "The Production of Sweet Potatoes for Food," by J. C. Miller, Louisiana State University, Louisiana; "The Operation of a Dehydration Sweet Potato Plant," by Douglas Warriner, St. Francisville, Louisiana; and "The Discussion of Problems Concerning Production and Dehydration of Sweet Potatoes for Food," by J. C. Miller and J. A. Schaller.

States represented at the conference were North Carolina, South Carolina, Georgia, Florida, Mississippi, Alabama, Louisiana, Oklahoma, Arkansas, and Tennessee.

Those in attendance from Clemson were: R. A. McGinty, Vice-Director of the South Carolina Agricultural Experiment Station; E. G. Godbey, Associate, Animal Husbandman; A. E. Schilleter, Extension Horticulturist; L. O. Van Blaricom, Associate in Horticultural Manufactures; and J. B. Edmond, Associate Horticulturist.

The program was arranged by J. B. Edmonds, of Clemson.



**PRACTICAL INSECT CONTROL***continued from page nineteen*

rotation of crops advisable, but also the entire garden should be moved to a new location every two or three years if enough space is available. The old garden site can then be turned into a chicken yard for a similar length of time and then the rotation can be reversed. The value of this cannot be over-estimated because it proves not only a method of destroying the immature stages of insects in the garden, but also a valuable source of fertilizer. By plowing up the garden in the fall, the overwintering stages of many insects are exposed and subsequently killed during the winter.

Damage by some insects can be prevented by planting early enough to gather a fast growing crop before the insects begin to feed. Melonworm damage to vine crops may often be prevented by planting early enough to escape the ravages of this pest. For some crops the date of planting can be delayed long enough to allow the insect's feeding stage to pass before the crop comes out of the ground or in the case of insects that attack fruit, before the plant begins to bear. In some cases it is helpful to set a few plants in the ground early for the insects to feed on, and then these trap crops can be covered with straw and burned or otherwise destroyed before the main crop is planted.

Even so simple a method as dusting plants with wood ashes will often repel certain insects.

Many insects overwinter in plant residue lying in the garden during the winter. All plants should either be destroyed completely or turned under the soil after the crop is gathered because otherwise they will provide food for insects even though they are useless to the gardener. Weeds and volunteer plants often harbor destructive insect pests. These plants should be destroyed whenever it is possible. Trash lying in the corners of the garden offers an excellent place for insects to hibernate during the winter, and such trash piles should be burned or thoroughly cleaned up.

It is impossible to thoroughly cover all points on the subject of Victory methods of insect control in

so brief an article, however, there are several good bulletins published on insect control by the Clemson College Experiment Station and Extension Service. If more detailed information about Victory methods of control or the use of insecticides is desired, the reader should consult his county agent or write to the Entomology Department of Clemson College about his particular situation.

## *Tribute to a Pioneer*



## *and the American Idea*

With the launching of the Liberty ship, "John Deere," the United States Maritime Commission pays tribute to one of America's pioneers in agricultural achievement.

"It is fitting that this honor be bestowed on the man whose vision and foresight, one hundred and six years ago, gave to the world the steel plow and founded the organization which bears his name."

The S. S. "John Deere," launched months ahead of schedule, is a typical product of the ingenuity and freedom of enterprise which are cornerstones in the American economy. We of the John Deere organization like to believe that our founder, himself a man whose ruling pride lay in a job well done, would derive a greater satisfaction from the speed and efficiency of American production than from the personal tribute paid him.

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**Moline,**

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## MARKETING SOUTH CAROLINA'S FARM PRODUCTS

Continued from page five

Our shippers sold potatoes into over twenty of the forty-eight states and a number of cars into Canada. With distribution like this you are not likely to overload any one market very much.

This is up-to-date marketing. The salesmen who sell these standardized products do not have to wait for a buyer to come along and then ask him what he will pay. They are as well informed on prices in the markets as the buyers. They know the grades of the cars they are selling and what the F. O. B. price should be and they quote them out at these prices subject to previous sale. The telephone and telegraph brings the buyer and seller together, but government grades furnishes the understanding terms.

When a car is sold it is diverted in transit to the purchaser on whatever terms agreed upon. This method enables one good salesman to intelligently sell hundreds of cars a day and also enables a buyer to intelligently buy hundreds of cars a day, reducing the cost spread between producer and consumer.

The canning of fruits and vegetables in South Carolina is also increasing rapidly and opens a means of broadening our market outlet and lengthening our market season. Standardization is just as important for these plants as the success of a procession plant is largely determined by the quality of the product it merchandizes.

We have in South Carolina both independent marketing agencies and grower-owned and grower-controlled cooperative marketing associations, so a grower of almost any commodity from cotton to hogs can sell through his own organization, or sell through an independent agency. We also have several vegetable and livestock auction markets and thirty-five home demonstration club markets.

Regardless of how we market our products the modern self-help store makes grading mandatory on fruits, vegetables and eggs. This is true because when they are put in the open bin the best grader in the world will grade them—(the housewife). When they grade out about half of what is in the bin, no other housewife will stop at that bin. And when they start walking by, and they will if the grade is not good, the producer must look for another market. This causes marketing trouble whether it happens in Boston or in the home town. If they don't sell in the bins they will not sell in the car for they all have to go through the bins. It has been said that a cull at grading time is a production error. Anyway, a cull is an article the trade does not want. It might be a wrong variety, too small, too old or immature, cut, bruised, diseased or decayed. Many of these errors can be avoided through proper production practices. South Carolina's answer to this is our coordinated production-marketing program — selecting varieties and producing according to market demands. You must know your picture before you mix your paint.

## THE DEVELOPMENT OF CLEMSON'S SCHOOL OF AGRICULTURE

Continued from page nine

its former self, but the interior was changed to a great extent with a view of using it for housing the library and various literary societies, but part of the building would be used for offices and classroom purposes. The library was moved from the Administration Building to the new Agriculture Hall building after its completion and has since then remained as the college library.

The three story Dairy Building was completed in 1912 at a cost of approximately \$20,000. It contains the offices of the animal husbandry and dairy division and a number of large classrooms and laboratories. It is equipped with modern machinery for manufacturing dairy products, separating, testing and marketing milk, experimental work and for teaching modern methods of dairying.

A Federal appropriation of \$350,000 was awarded to Clemson for the construction of a separate agricultural building. It was erected on the site which was occupied by the South Carolina Extension Office Building, just opposite the Dairy Building.

Work on this project began February, 1936 and was completed in May, 1937. This building houses the work of the School of Agriculture, the Division of Extension Service, and the offices of the South Carolina Experiment Station. The Departments of Botany, and Bacteriology, Entomology and Zoology, Agronomy, Veterinary Science, Agricultural Economics, Poultry Husbandry, Horticulture, and Agricultural Engineering are now stationed in this building.

The modern new agricultural building is named Long Hall, School of Agriculture, in honor of Dr. W. W. Long, for 21 years director of South Carolina Extension Service.

The completion and use of this up-to-date School of Agriculture realizes even more vividly the life-long dream of Thomas G. Clemson who left his all in order that South Carolina might have an outstanding agricultural and mechanical college.

### THE ANIMAL HUSBANDRY DEPARTMENT

of

### CLEMSON COLLEGE

#### Purebred

Berkshire Swine  
Polled Hereford Cattle  
Hampshire and Southdown Sheep

## PORK PRODUCTION IN SOUTH CAROLINA

Continued from page six

the planting of soybeans and corn together, while there is no particular advantage in doing so. Experiments show that these crops seeded separately produce equally good results, however, soybeans, being the most complete vegetable protein, should be provided when possible.

When swine are on forage a good ration would be corn and fishmeal, one part fishmeal to fourteen parts of corn. Due to the existing conditions it is very difficult to buy fishmeal. A good alternate as a ration would be corn and a vegetable protein of equal parts by weight of cotton seed meal, soybean meal and peanut meal.

For pigs on dry lot a suitable ration would consist of: corn and the "trinity mixture," a supplement consisting of 5 per cent fishmeal or tankage, 25 per cent cotton seed meal or soybean meal, 25 per cent alfalfa meal or lespedeza meal. It has often been pointed out that our state could never become an important livestock state because of the deficiency of minerals in our soil. This condition may be remedied by feeding a cheap limestone, or oyster shells and one part salt.

As to management it is of prime importance that only purebred stock be used so as only aggressive, fast growing pigs will be farrowed. South Carolina, due to its mild weather, farmers should plan their program so as to raise two litters per year. Having pigs farrowed March 1 and September 1, by following such a program fat hogs should be marketed about September 1 and April 1.

In South Carolina there is the scourge of disease. The most common diseases which hogs suffer are: hog "flu," hog cholera, and tuberculosis. The casual agent of "flu" is unknown and the only treatment for affected hogs consists in placing them in warm dry quarters and allowing them as complete a rest as possible besides giving them a constant supply of fresh drinking water. Cholera is an infectious disease which spreads very rapidly. Hogs may be immunized to cholera by the Virus-serum treatment. If any animal dies from the disease, the carcass should be burned, not buried. Tuberculosis is second only to hog cholera as a cause of losses from disease. The source of this disease is very largely tuberculous cattle. Hogs contract the infection by drinking unsterilized, contaminated milk or dairy by-products or by eating grain that has passed undigested through tuberculous cattle. Hogs affected with the disease should be fattened and sold.

Parasites also cause some loss of swine in South Carolina. Parasites may be controlled by switching your hogs to new pastures regularly and by plowing and seeding temporary pasture at least once a year.

Lice and mange may be controlled by the spraying, dipping and using hog oils and medicated hog

wallows. Applying burnt oil on pigs' backs several times during the year is an effective and cheap means of control.

Our government has asked for a 6 per cent increase in pork production in South Carolina for 1943. This goal may be accomplished by:

1. Breeding more sows.
2. Saving a larger percentage of hogs by wise management and care.
3. Making the hogs heavier, 200-250 instead of 175-200. Heavier hogs demand top price up to a weight of 360. It is not advisable, however, to fatten pigs to over 250 pounds.

At the present time there is a great demand for pork and a high price being offered for South Carolina to come into its own and establish herds of swine. Hogs are often referred to as "the mortgage lifter" due to the fact that they have paid off more mortgages than any other single enterprise. Now is the time for South Carolina to take advantage of the hogs' merits and make him a mainstay in our diversified farming program. Our government is planning on South Carolina coming through with the production of more pork so let's get on the job and make the hog help us to win the victory for ourselves and for our country.

—THE AGRARIAN—

## THE AGRARIAN PRESENTS

FRED HARVEY HALL CALHOUN, Ph. D.

Continued from page ten

thority on various matters pertaining to the construction of the dam and the location of the dam site.

In his thirty-nine years of continuous service to Clemson, Dr. Calhoun has rendered a great service not only to the college, but the state as well. His record will not soon be forgotten by those whom he has taught, advised, or been associated with in any way in his long and colorful career.

—THE AGRARIAN—

## AG HOUSE PERSONALITIES

MR. L. O. VAN BLARICOM

Continued from page eighteen

last year hundreds of cases of peaches, 1580 gallons of apple cider, and smaller amounts of asparagus, beans, corn, tomatoes, and nectarines were canned under his supervision.

While in Oregon "Van" enjoyed mountain climbing as a hobby, but now his work at the cannery and teaching take most of his time though he still finds time to occasionally dabble in photography.

Anytime you want to make a new friend, just go by and introduce yourself to "Van." I'm sure you will find it time well spent. If you cannot find him at his office in the horticulture department, then go to the cannery and you will certainly find him there.



# IMPROVEMENT OF CATTLE BY HERD CLASSIFICATION

J. W. DANTZLER, '44

## MILK PRODUCT NEEDS DEMAND HERD IMPROVEMENT

It has long been realized that desirable type and profitable production go hand in hand in the improvement of the dairy herd. Especially now, production is of primary importance and must be on an economic basis on the great majority of our country's dairy farms if we are to begin to supply the world's needs for dairy products.

In response to the need of a definite system whereby a prospective purchaser of cattle might readily verify any statement the owner might make regarding the type of animal in question, The American Jersey Club, in 1932, adopted the Jersey Herd Classification program. At the start little was known of classification, and there was no great campaign made to popularize it. The program was simply offered as an additional means of aiding the breeder of registered Jerseys. As a consequence of Herd Classification, the breeder has an opportunity of knowing how an experienced judge places his cattle, not in competition with other animals of the same age class, but in comparison with the ideal type as described in the score card adopted by the American Jersey Cattle Club.

When the program was first offered, the thought was expressed that herd classification would be of more interest to the small herd breeder who does not exhibit cattle on the show circuit than to the owner of a large herd. This has not proven to be the case. Soon after the program was adopted, a number of the leading herds in the country were officially classified, and many of them have been reclassified several times since. And recently, the owners of small herds have been applying for Herd Classification in increasing numbers. Many breeders now place classification close to production testing in importance when the improvement of the herd is being considered.

Herd Classification is of definite value in a sales program. By listing cattle with their production records plus their classification ratings, the picture is complete. The prospective buyer, whether he is buying by mail or by sight, then has a more definite knowledge of the animal he is about to purchase. Also, classification tends to rid the herd of animals that are poor in conformation. This is one of its major objectives, similar to production testing in the weeding out of the low producers. Both plans contribute greatly to the improvement of the breeding of cattle.



As a result of dairy cattle improvement work, South Carolina now ranks among the top three states in the number of Advanced Registry class leaders with annual production records of 600 lbs. of butterfat or over.

Cattle are classified into six groups as compared to the ideal. They are: Excellent, Very Good, Good, Fair, and Poor.

Actual records bear out the assumption that desirable type and production go hand in hand. Through March 31, 1939, there had been 5,739 animals officially classified as excellent. The average mature production of this group of animals in pounds of butterfat figured on a 365 day equivalent basis was 655.42 pounds. There were 1243 animals classified Very Good and producing an average of 619.78 pounds of butterfat. The Good Plus, Good, Fair, and Poor groups producing an average of butterfat of 595.64, 576.89, 573.50, and 557.00 pounds, respectively, each year. Undoubtedly, if an equal percentage of each classification group had been tested, the differences in production would be even more pronounced.

A total of 82 Jerseys in the Clemson herd have been classified. Of this number, 19 animals have been classified as being Very Good, 42 as being Good Plus, and 21 as being Good. High production has been almost entirely consistent with high classification among this group of animals.

It was never intended that Herd Classification should replace the program of production testing. It is true that there are often pronounced variations in the producing abilities of animals of similar conformation. Such differences can only be determined through production testing. It would appear, however, that as the conformation of herds are improved, the production will be increased.



# PLAN YOUR VICTORY GARDEN NOW RAISE MORE FOOD—AND SAVE IT ALL!



## FOR YOUR FAMILY—FOR YOUR COUNTRY

**F**OOD is being rationed in the land of plenty! America is at war, and FOOD is a weapon as powerful as all our planes and battleships. If FOOD fails, we cannot win the peace.

This year farm production will be strained to the utmost, but farm fields alone cannot produce enough food to meet the nation's needs in 1943.

This year that great American institution—the family garden—will come back into its own. Millions of Victory Gardens will yield a vast store of vegetables and fruits, and Uncle Sam will give his blessing to each and every one. Home-grown health and energy will supply the tables all summer and stock the pantry shelves against the winter. Millions of tons of precious food will be released for shipment to our Armed Forces and to supply the vital needs of

our fighting allies on the battle fronts.

The Victory Garden Program, sponsored by the Department of Agriculture and the Office of Civilian Defense, can make all the difference between war and Peace!

Have a Victory Garden this year and make plans for it *now*. It will take planning, and it will mean extra work for your busy household, but there will be big rewards in health and in profits. You will be thankful in summer to have fresh vegetables each day for the family table—and *doubly thankful* next winter to have abundant food when the markets are bare of canned goods.

Plan a *big* garden. If you had one last year, don't be afraid to *double* your acreage. Remember it's for Victory in a year of scarcity! Plan the long rows that are quickly cultivated with other

farm crops, and see that the soil is made fertile and rich. Plan your way through the picking and harvesting, the canning and preserving, the disposal of your surplus crops. Plan to *share* your garden—*both the work and the yield*—with families in town who have no room for gardens. And buy a War Bond with Victory Garden profit!

Start things right now, by filling out the coupon below and send for Harvester's garden booklet. It's a dandy. Yours for Victory—INTERNATIONAL HARVESTER COMPANY.

INTERNATIONAL HARVESTER COMPANY  
180 North Michigan Avenue, Chicago, Ill.  
I'm going to "Have a Victory Garden."  
Please send the booklet to

Name.....  
Address.....  
City..... State.....

## INTERNATIONAL HARVESTER





**TROUBLE FOR TOJO!** It's the new Curtiss "Helldiver," the Navy's latest dive-bomber, designed to carry a bigger bomb-load than any naval dive-bomber in existence. At the controls in this test dive, photographed above, is Barton T. Hulse, who learned his flying in the Navy... smokes the Navy man's favorite—Camel.

"There's just one cigarette for me—**CAMEL**—they suit my throat and my taste to a 'T'"

says

**"RED" HULSE**

VETERAN NAVY FIGHTER PILOT AND CHIEF TEST PILOT  
OF THE NAVY'S  
NEW CURTISS  
DIVE-BOMBER

THEY can look terrific on paper... meet the most exacting laboratory tests on the ground. But the final proving ground of an airplane is in the air... when you fly it.

It's the same with cigarettes. The final test of any brand is in the smoking.

Test pilot "Red" Hulse and countless other smokers could tell you convincing things about Camels and their remarkable freedom from irritating qualities, but your own throat and your own taste can tell you even more convincingly why Camels are such a favorite on the front line—on the home front.



# Camel

**FIRST IN THE SERVICE**

The favorite cigarette with men in the Army, Navy, Marines, and Coast Guard is Camel. (Based on actual sales records in Post Exchanges, Sales Commissaries, Ship's Service Stores, Ship's Stores, and Canteens.)



**THE T ZONE**

—where cigarettes are judged

The "T-ZONE"—Taste and Throat—is the proving ground for cigarettes. Only *your* taste and throat can decide which cigarette tastes best to you... and how it affects your throat. For your taste and throat are individual to you. Based on the experience of millions of smokers, we believe Camels will suit your "T-ZONE" to a "T."

